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CLINICAL HISTORY

OF THE

DISEASES OF WOMEN

By the same Author,

Lectures on Obstetric Operations, including the Treatment of Hæmorrhage, and forming a Guide to the Management of Difficult Labour. Third Edition, with 124 Engravings, 8vo, 18s.

A CLINICAL HISTORY

OF THE

MEDICAL AND SURGICAL

DISEASES OF WOMEN

BY

ROBERT BARNES, M.D. LOND.

CENSOR OF THE ROYAL COLLEGE OF PHYSICIANS, LUMLEIAN LECTURER (1873); LATE EXAMINER IN OBSTETRICS AND THE DISEASES OF WOMEN AT THE UNIVERSITY OF LONDON AND THE ROYAL COLLEGES OF PHYSICIANS AND SURGEONS; OBSTETRIC PHYSICIAN AND LECTURER ON OBSTETRICS AND THE DISEASES OF WOMEN TO ST. GEORGE'S HOSPITAL

SECOND EDITION

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Dear Dr. Fordyce Barker,

I rejoice at my good fortune in being allowed to place this book under your protection. Your imprimatur will help me to bear more lightly the burden of its many faults.

And let me here express through you, in whom are so happily combined the genial heart and the scientific spirit which animate our American brethren, my gratitude for the unbounded kindness which made my visit to them an epoch of pleasant memories.

Yours ever truly,

ROBERT BARNES.

To Fordyce Barker, M.D., LL.D.,

First President of the American Gynæcological Society.

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PREFACE.

THE First Edition of this work has been long exhausted. I have not on that account hurried the preparation of this Second Edition. The book has been subjected to conscientious revision. It is hoped that some of its defects have been either removed or lessened. By pruning redundancies, and by re-arrangement, space has been gained for the addition of new matter. The size of the book is not increased; yet room has been found for a new Chapter on the Relations of Bladder and Bowel Disorders to the proper subject-matter of the book.

Many new illustrations have been added. I think it not unimportant to state, that I have given under every borrowed illustration the source whence it was taken. The illustrations contributed by myself are indicated by my initials.

Although the work is essentially the fruit of my experience and study as a practitioner, teacher, and examiner, I have earnestly sought to correct my own observations, and to enrich the book by drawing from other sources. I have, as a rule, specified in the text the titles of the works consulted. The opportunity is thus afforded to my readers of controlling my citations, and of extending their information, by appealing to the original sources. The instances are rare in which I have failed to consult directly the authors cited. The copious index of authors will bear testimony to my diligence in this way. This index and the titles of the works referred to will supply a fairly comprehensive bibliography of the subject.

For useful aid in correcting the press, and in otherwise lightening the labour incidental to the preparation of a work of this kind, I am indebted to my son Dr. Fancourt Barnes.

ROBERT BARNES

15, Harley Street, London,
June, 1878.

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TREATISE ON THE DISEASES OF WOMEN.

CHAPTER I.

INTRODUCTORY: ANATOMY OF PELVIC ORGANS: THE OVARIES; FALLOPIAN TUBES; UTERUS; DOUGLAS'S POUCH; AXIS AND MOVEMENTS OF UTERUS; CHANGES UNDER MENSTRUATION; VAGINA; VULVA.

It may seem superfluous to state that a clear knowledge of anatomy is the antecedent condition of a correct understanding of disease, diagnosis, and treatment. All sound medicine is based upon this proposition. But it is more strictly true of the diseases of women than it is of disease in general. For example, it is quite possible to imagine a satisfactory diagnosis to be made of a fever and to treat it successfully, without any precise knowledge of anatomy; but in the diagnosis and treatment of morbid conditions of the female pelvic organs it is hardly possible to move a step without precise knowledge of their anatomy and physiology; that is, without imminent risk of falling into error in practice.

It therefore becomes especially desirable to introduce the study of the medical and surgical diseases of women by an adequate description of the organs specially concerned. It might be thought to be sufficient to refer the reader for this to any one of the many admirable works on anatomy which we now possess; but this, it would quickly be found, would very imperfectly answer the purpose. Anatomical text-books teach *pure anatomy* only, certainly as far as the diseases of women are concerned. What we want is the *applied anatomy* of the sexual system.

Almost every physiological or pathological condition of the pelvic organs is attended by variations more or less marked either in their tissues, in their shape, size, or in their relative positions, and often in all. Hence the necessity of keeping constantly before us the normal standard by which we may estimate the abnormal deviations and understand how these are to be corrected.

The principal organs we are concerned with are all contained *within the true pelvis.* They are further enclosed or packed between the peritoneum above and the perineum below.

These organs are the ovaries, the Fallopian tubes, the uterus, the vagina, and vulva. The rectum and bladder, also contained within the same region, are indirectly important, in consequence of their physiological and pathological relations to the genital organs.

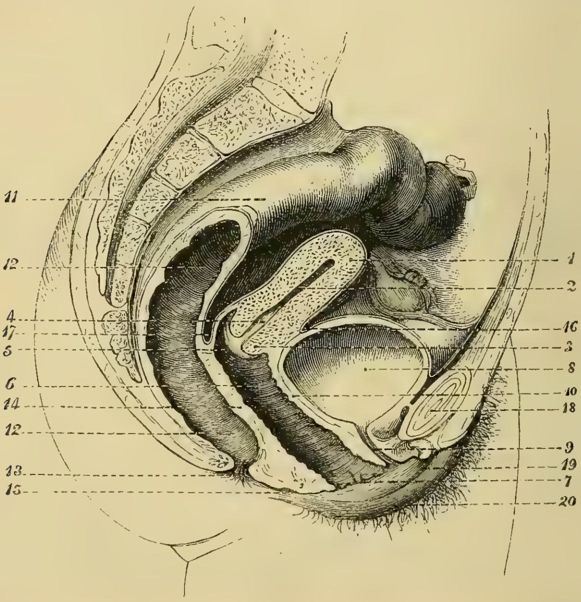

Fig. 1.

SHOWING THE PELVIC ORGANS IN SECTION—(AFTER SAPPEY).

1, body of uterus; 2, its cavity; 3, the vaginal portion; 4, canal of cervix; 5, os uteri externum; 6, the vagina; 7, orifice of vulva; 8, interior of bladder; 9, urethra; 10, vesico-vaginal septum; 11, rectum; 12, its cavity; 13, anus; 14, recto-vaginal septum; 15, perineum; 16, vesico-uterine sac of peritoneum; 17, recto-vaginal or Douglas's sac of peritoneum; 18, os pubis; 19, labium minor; 20, labium majus.

The pelvic organs are all related to each other by position, by connecting tissues, and by a system of blood-vessels common in their source, and intimate in their mutual play. The organs of the pelvis in their relative positions are displayed in section in Figs. 1 and 10, and from above in Fig. 2: 1 is diagrammatic, and Breisky's is taken from nature from a frozen body.

The connective tissue being distributed everywhere at the points of union of the organs, carries the blood-vessels, nerves, and lymphatics to the organs.

In certain parts this connective tissue is limited by fasciæ.

In addition to these organs, we have to remember that the pelvis is traversed by blood-vessels and nerves, which are not strictly related to the genital organs, but which are liable to be implicated in various ways, as by pressure, during gestation and labour, by tumours, or displacement of the ovaries or uterus. These vessels and nerves lie in close contact with the walls of the pelvis, and have their exit at the sacro-sciatic notches, at the brim under Poupart's ligament and the obturator foramina.

Then there are muscles, all cushioned by fat and cellular tissue.

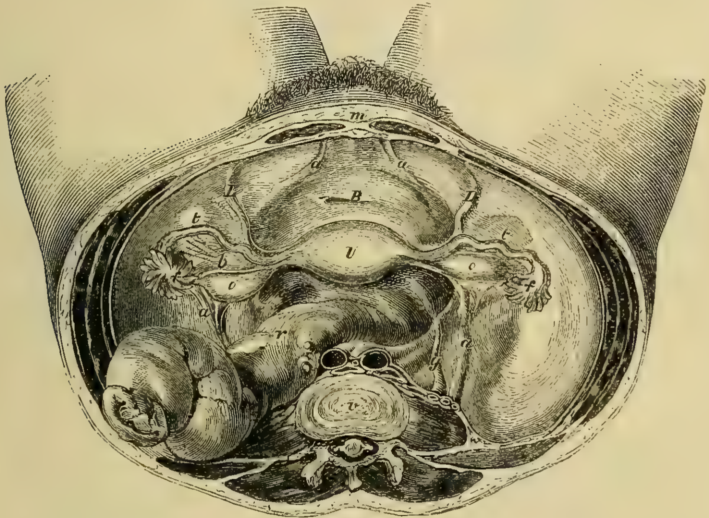

Fig. 2.

TRANSVERSE SECTION JUST ABOVE PELVIC BRIM, SHOWING THE RELATIVE POSITION OF THE ORGANS AS SEEN FROM ABOVE—(AFTER SAVAGE).

m, pubes; *a*, *a*, (in front) remains of hypogastric arteries; *a*, *a*, (behind) spermatic vessels and nerves; B, bladder; L, L, round ligaments; U, uterus seen by its fundus; *t*, *t*, Fallopian tubes; *o*, *o*, ovaries; *r*, rectum; *g*, right ureter resting on the psoas muscle; *c*, utero-sacra ligaments forming the lateral borders of Douglas's pouch; *v*, last lumbar vertebra.

The strictly genital organs consist of—1st, two glands, the *ovaries*, in which the ova are formed; 2nd, the *uterine tubes*, called Fallopian, which are true excretory ducts to the ovaries; 3rd, the *uterus*, a muscular organ in which the fecundated ovum is received and is developed, and which is the principal agent in the expulsion of the fœtus; 4th, the *vagina*, a canal which connects the uterine cavity with the exterior, and serves in copulation; 5th, the *vulva*, an assemblage of organs placed around the entrance of the genital organs. Associated with the genital organs are the *breasts*, whose function it is to secrete the milk, the first nourishment of the infant.

THE OVARIES.

1. The *ovaries* are so called from their containing small vesicles or ova. They are two; they are placed in front of the rectum, from which they are often separated by convolutions of the small intestine, on either side of the uterus, behind the Fallopian tubes, and in that portion of the broad ligaments which is called the posterior wing or fold. They are maintained in position by the broad ligaments, which make for them a kind of mesentery, and by a special ligament, the *ligament of the ovary*. The situation, however, varies according to the age and the condition of the uterus. In the fœtus, they are placed in the lumbar region, like the fundus of the uterus. In mature women, the ovaries lie nearly on a level with the fundus of the uterus. If enlarged or increased in weight, they tend to fall, and thus to drop into the Douglas's pouch behind the lower segment of the uterus. During pregnancy they rise in the abdomen with the body of the uterus, to the sides of which they are applied. Immediately after delivery, they occupy the internal iliac fossæ, where they sometimes remain throughout life, fixed by accidental adhesions, or adhesions may bind them to the rectum. Frequently they are found turned backwards and adhering to the posterior surface of the uterus. Sometimes an ovary is found in the sac of an inguinal, a femoral, or even of an umbilical hernia.

Cases have been met with in which no ovaries were found. It must be very rare that organs so essential are absolutely wanting *ab initio*. There is a preparation in University College Museum from a girl, aged 20, who had never menstruated. The uterus presents the features characteristic of early childhood, and no ovaries are manifest. When not discovered, the ovaries may have disappeared by atrophy, the result of some morbid process.

The *size* of the ovary varies according to age, the condition of the uterus, and health or disease. In the adult it measures an inch or two inches in length, an inch in breadth, and half an inch in thickness. The average *weight* is 87 grains. It is proportionally larger in the fœtus; it diminishes after birth, it enlarges considerably, becoming softer and more vascular at the epoch of puberty, and becomes atrophied and hard in old age. It enlarges during menstruation; and if an ovule be impregnated, the ovary may acquire double or treble the size of the ordinary state.

The *shape* is that of an ovoid, a little flattened from before backwards; the outer extremity, that looking towards the fimbriated end of the Fallopian tube, is rounder and thicker than the inner extremity, which looks towards the uterus. The anterior surface, like that of the uterus, is flatter than the posterior, which is gibbous. The upper border is convex; the lower one is straight or concave. The colour is whitish. The surface is smooth during childhood (as seen in Fig. 3); after puberty it becomes scarred by the repair of the rents made in the tissues to afford escape to the ova at the menstrual periods (as seen in Fig. 4); but in young women smooth interspaces may still be seen. The ovary is free in front, above and behind; it floats in the pelvic cavity, fastened, 1st, by its lower border to the broad ligament which is furnished with a

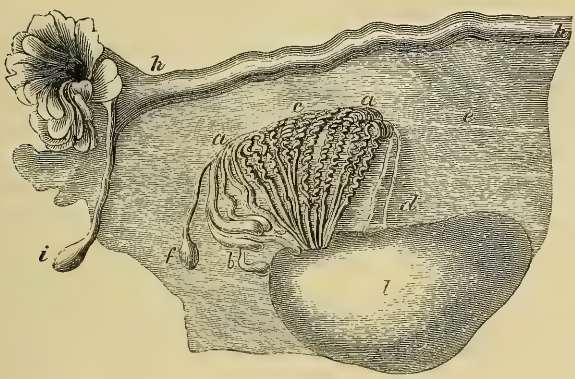

FIG. 3.

ADULT PAROVARIUM, OVARY, AND FALLOPIAN TUBE—(AFTER KOBELT).

a, a, tubules of the original Wolffian body or parovarium; *b*, remains of the upper set which occasionally become distended by collections of fluid, and constitute one form of dropsy of the broad ligament; *c*, middle set of tubules; *d*, lower set atrophied; *e*, atrophied remains of the excretory duct of the Wolffian body; *f*, terminal bulb of the same, converted here into the hydatid often seen attached to the broad ligament; *h*, the former duct of Müller, now the Fallopian tube, with its infundibulum from which hangs *i*, the terminal bulb, now converted into a pedunculated hydatid; *l*, generative gland, now the ovary.

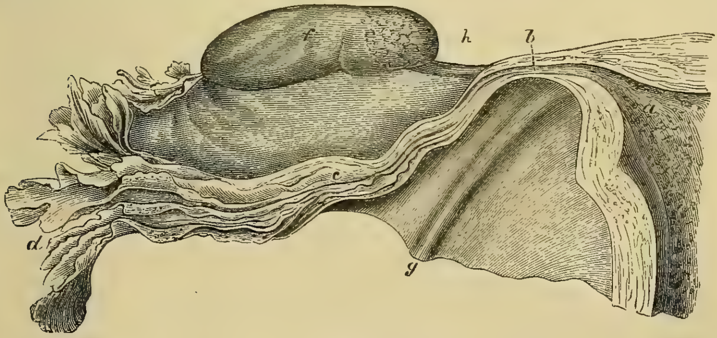

FIG. 4.

RIGHT FALLOPIAN TUBE LAID OPEN. FROM AN ADULT WHO HAD NOT BORNE CHILDREN—(AFTER RICHARD).

a, funnel-shaped canal, leading from the uterus to *b*, uterine portion of the tube; *c*, point at which the large plicæ commence; *d*, infundibulum covered by plicæ, continuous with those lining the canal; *e*, tubo-ovarian ligament and fringes; *f*, ovary; *g*, round ligament; *h*, ligament of the ovary.

peritoneal investment, and represents the hilum of the gland. Along this border blood-vessels penetrate and emerge; 2nd, it is fastened by its outer extremity to the pavilion of the Fallopian tube (see Fig. 4); and 3rd, by its inner extremity to the corresponding side of the uterus, a little below the superior angle of this organ, by a cord named the *ligament of the ovary* (see *h*, Fig. 4). This cord is fibrous and muscular, and is simply a prolongation of the proper tissue of the uterus.

The ovary is usually described as composed of an investment and parenchyma; the investing structure consisting of the *peritoneal* or *serous coat*, and of an inner fibrous coat called also the *tunica albuginea.* The two, however, are so intimately blended that it is impossible to separate them; nor is it easier to separate a fibrous coat from the parenchyma. Indeed, Sappey denies the existence of peritoneal coat and fibrous coat alike. The peritoneum is represented only by a simple layer of epithelium; and of tunica albuginea there is not even a vestige.* When the ovary is divided perpendicularly to its surface, it is seen to consist of two very different parts:—1st, a superficial part, white, of firm consistence, of homogeneous aspect; 2nd, a central part, reddish, spongy, clearly formed of various elements. The superficial or peripheral part is the exclusive seat of the ovarian vesicles. The deep or central part is essentially made up of vessels, muscular fibres, and laminar fibres. The first part Sappey calls the *glandular* or *ovigenous,* and the second the *vascular* or *bulbous* part. Direct observation and anatomical analysis establish very precisely the line of demarcation between them. The glandular portion is only 1 mm. thick, sometimes less. It assumes the aspect of a bark which covers both faces, both ends, and the free border of the ovary. It is this which, its nature and uses alike misunderstood, has been especially described under the names, proper tunic or fibrous tunic. The central portion forms nearly the whole mass of the organ.

We will first examine the *bulbous portion.* Upon this is spread, so to speak, the ovigenous layer. It comprises smooth muscular fibres, connective tissue, vessels, and nerves. The muscular fibres, described in 1858 by Rouget, very numerous, are disposed in bundles. They proceed from the ligament of the ovary, from the ligament of the Fallopian tube, the posterior round ligament, and the posterior winglet of the broad ligament. The fibres arising from these sources are directed from below upwards, radiating in all directions, and partly crossing. The fibres of connective tissue especially follow the track of the vessels, binding them together, and to the muscular bundles. With these fibres are mingled a large number of fibro-plastic fusiform bodies.

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* Sappey, "Anatomie Descriptive," 1874.

The *arteries* proceed from branches of the utero-ovarian. They are numerous and of large relative size. All penetrate the gland by its adherent border, and thence radiate towards the periphery. These arteries are extremely flexuous; most of them twine around a fictitious axis, describing a spiral, the turns of which approach so closely that, strongly compressed between two laminæ of glass, they still preserve the shape of a cork-screw. This spiral character is manifested in injected specimens even before the arteries enter the ovary. The arterial divisions in their course anastomose, and ultimately form a network, the meshes of which become smaller and smaller as they approach the surface of the gland.

The *veins* are remarkable alike for their number and their size. They therefore constitute a large proportion of the bulbous part. They begin, as all veins do, by radicles continuous with the capillaries. But they rapidly get larger, become knotty, as if varicose at points, and form by anastomoses a plexus with singular meshes. From this plexus emerge trunks which run parallel to the arterial divisions and terminate in the utero-ovarian vein.

The *lymphatic vessels* are also remarkable for their size. Their origin has not been made out. From the convergence of their radicles result six or eight trunks which run towards the hilum of the gland to join the lumbar ganglia. M. His points out that the lymphatics in the hilum are often found filled with pus, the consequence of puerperal peritonitis, which is often complicated with ovaritis and inflammation of the lymphatic vessels.

The *nerves* come from the ovarian plexus which, passing beneath the adherent border of the ovary, gives up to it the greater number of its twigs. These penetrate with the arterial divisions into the interior of the organ.

M. His* is of opinion that the entire interstitial tissue of the ovaries is nothing but a peculiarly modified and confused mass of muscular tissue, and he proposes for it the name "fusiform mass." Rouget regards the arrangement by which these muscular fasciculi accompany the vessels in the form of sheaths, as analogous to that which obtains in erectile tissues. But Sappey points out this distinction, that erectile tissue is especially formed of big capillaries, very short and anastomosing, supported by muscular scaffolding, and into which the ultimate divisions of the arteries open; whilst in the ovaries it is not only simple capillaries that we see, but true veins exhibiting their usual arrangement. There are no dilated capillaries, no areolæ, no framework. And Waldeyer observed† that at present we cannot be said to possess any direct observations on the erection of the ovaries.

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* "Beobachtungen über den Bau des Saugethiereierstocks." Max Schultze's Archiv. f. mikrosp. Anat., 1865.

† Stricker's "Manual of Histology," N. Sydenham Soc. 1872.

The uses of the bulbous portion are to support the ovarian vesicles and the ovules by offering them to the contact of the pavilion of the Fallopian tubes; and to supply the vesicles and ovules with the elements of nutrition.

The peripheral or cortical or *ovigenous* portion constitutes the essential part of the ovary, that in which the ovule is formed. It is the first part formed in the embryo. In it are distinguished the *ovisacs* or *Graafian vesicles,* destined to secrete and expel the ovum.

Immediately beneath the serous epithelium the stroma is found composed of bundles of connective tissue variously crossed; near the bulbous substance it presents the irradiations of the connective fibres of this part. What distinguishes the connective tissue is the enormous quantity of interstitial nuclei revealed by acetic acid, described by Rouget as fusiform fibroplastic bodies. Between these two layers of connective tissue is a layer, the variable thickness of which mainly determines the differences in size which the ovary presents. It consists essentially of fusiform nucleated cells, strongly compressed against each other, and sometimes furnished with filiform prolongations, very short and penetrating into the interstices of the adjoining cells. The Graafian vesicles or follicles are scattered in the stroma of the cortical substance, chiefly in the most superficial layer. The limitation of the ovules to the peripheral portion is most marked in infancy. After puberty they are apt to invade the bulbous portion. Towards puberty the follicles are found close together. Their number is very great. To give an approximate idea, Henle makes the following calculation: In the ovary of a person eighteen years old an antero-posterior section, forming about a sixth of the periphery of the organ, showed 20 follicles; in the entire section there would be 120 follicles; and as it would be possible to divide the ovary into 300 sections, it follows that each ovary contained 300 times 120 or 36,000 follicles, or 72,000 for each woman.

Sappey makes a much higher estimate. The ovaries, he says, contain on an average 600,000 to 700,000 germs. Woman possesses already in the embryonic state all the ovisacs she is ever to have. The number remains what it was, subject to diminution by maturation, by atrophy, by the cicatricial process, by inflammations, and other influences.

A great number of *vessels* spread out in the ovigenous layer. They form by anastomoses a very rich network. Most of the capillaries end at the periphery of the ovary forming arches and irregular loops. The minute arterioles which are lost in this capillary network preserve the spiroid direction which they had in the bulbous portion. Their last divisions are spread around the ovarian vesicles. The veins are remarkable for their size, and by the frequent swellings observed in their course. The lymphatics spring from the peripheral layer. Sappey says that it is not rare to find in the alar mesentery, especially round about the ovary, several cystic ovules, some of them the size of a pea. They may be regarded as stray ovules, which have failed to become incorporated in the ovary. They may possibly be the germs of some of the cystic tumours observed in the broad ligament.

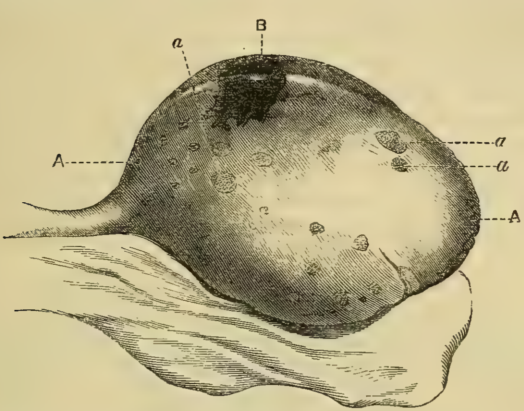

FIG. 5.

A, A, ovary enlarged under menstrual nisus; B, ripe follicle projecting on surface; *a*, *a*, *a*, traces of previously burst follicles—(AFTER RACIBORSKI).

The follicles, at first microscopic, rapidly grow after puberty when they are destined to mature. They form a hemispherical bulging on the surface of the ovary. This ripening appears to take place rapidly, since only a small number of follicles is usually made out by the naked eye; that is, in process of development; yet it is certain that every month one follicle, at least, arrives at complete maturation.

When ripe, the *follicle,* or *vesicle,* or *ovisac,* consists of an *investing membrane* and *contents.* 1. The investing membrane presents an outer or *fibrous tunic,* a middle or *proper tunic,* and an inner or *epithelial* or *granular layer.* The first is thick, very vascular, and very retractile; it is united to the stroma by a loose cellular tissue: hence it is easily isolated. It is formed of compact bundles of connective tissue arranged in concentric layers. The tunica propria is also composed of connective tissue; but this is in a more embryonic state, and contains a multitude of nuclei and fusiform cells. This tunic is also much less retractile than the fibrous tunic. The *epithelium* which lines the membrane of the follicle inside is composed of one or more layers of polygonal cells, enclosing a large nucleus and some fatty granules. The epithelium is much thicker at the part which surrounds the ovum. At the level of this part the accumulated cells form a warty swelling, which bulges into the cavity of the follicle. This swelling is the *cumulus* or *discus proligerus.* The ovum is situated in the middle of the cells of the proligerous disc, part of which it carries along with it, when, after the dehiscence of the follicle, it leaves the ovary to enter the oviduct. The ovum is a spherical vesicle; it may be represented as a simple cell. The membrane of the cell is called the *vitelline membrane;* it is very thick, perfectly hyaline and transparent, resisting and very elastic. The contained matter is called the *vitellus;* this is a viscous liquid, of yellowish colour, in which are seen a multitude of granulations. A large vesicular nucleus, called the *germinal vesicle,* is situated excentrically in the vitellus, and itself contains a small *nucleolus,* the *germinal spot.* It is rare to find two ova in the same follicle.

The follicle contains a transparent, yellowish fluid, resembling serum; at first this is very small in quantity, but increases gradually as the follicle approaches maturation, until the tunics, swollen and thinned by this accumulation of liquid, burst at the culminating point, and discharge their contents.

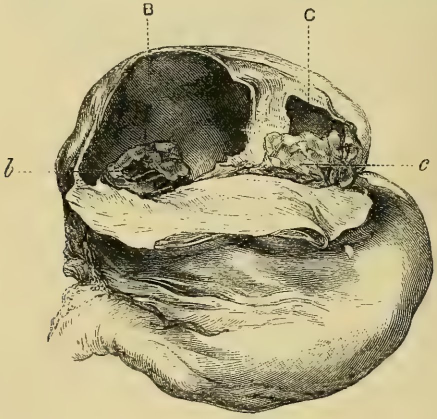

Fig. 6.

SHOWING MENSTRUAL CORPUS LUTEUM AND OVARY—(AFTER RACIBORSKI).

B, cavity of Graafian sac from which ovum has escaped; *b*, clot of blood in sac.

Corpora Lutea.—When the follicles have burst, and the ovum has escaped, a process takes place which results in the formation of the so-called yellow bodies. On the bursting of the follicle, its membranes collapse. The retraction is due entirely to the fibrous membrane; the internal membrane and the granular layer having no elasticity simply follow the movements of the fibrous tunic, and form folds, just as the mucous membrane of the stomach does under the influence of the contraction of the muscular coat. The cavity of the follicle is thus greatly contracted; a small quantity of blood, escaped from some ruptured vessels, is retained, but only as an exception, according to Coste, in the cavity, which is early invaded by a plastic and gelatinous secretion furnished by the inflamed part. Soon the cellular and granular layer, a part of which has been expelled with the ovum, undergoes a kind of hypertrophy, which gives it an enormous size. Every cell becomes about six times as large as before; this growth is especially due to the accumulation, in the inside of the cells, of a multitude of yellow granules of albuminous nature, giving to the whole follicle the colour which suggested the name of yellow body. Owing to this hypertrophy and to the folding of the inner membrane, the cavity of the follicle is at last completely closed. The circumvolutions of the inner membrane coming into contact grow together; and even after having obliterated the cavity they continue to grow, and thus, not finding room in the retracted external tunic, they often project as a hernia through the rent of the follicle, and are seen outside resembling luxuriant fleshy granulations. At this stage the burst follicle is a rounded tumour, bulging on the surface of the ovary, in size sometimes equal to or exceeding that of the rest of the organ. The process which gives rise to the *corpus luteum* begins soon after the escape of the ovule, and increases in activity up to the thirtieth or fortieth day of pregnancy. The yellow bodies then remain stationary until near the end of the third month, and from that date they begin to decline; the convolutions, united together by adhesions more or less intimate, atrophy and leave true fibrous bands; at the same time the yellow granulations are absorbed, the cells disappear, whilst the vessels retract and are atrophied. At the moment of labour the corpora lutea are still large, but the process of absorption goes on after delivery, and ends by bringing about their complete disappearance. Then there remains on the surface of the ovary nothing but an irregular scar to mark the place of the rupture.

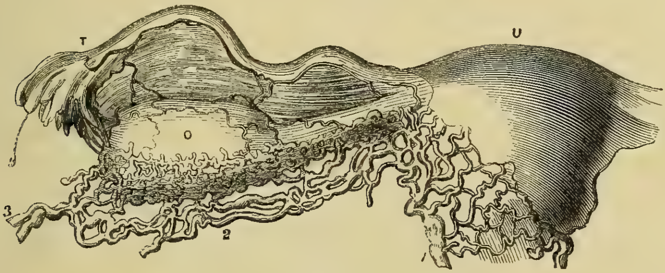

FIG. 7.

BULB OF OVARY—(AFTER SAVAGE).

The venous erectile system of the ovary, the anterior layer of the tubo-ovarian mesentery dissected off. U, uterus; O, ovary and utero-ovarian ligament; T, Fallopian tube. 1. Utero-ovarian vein; 2, Pampiniform venous plexus; 3, commencement of spermatic vein.

There are considerable differences in the evolution of the corpora lutea. The most remarkable is that which depends upon whether the discharge of the ovum has been followed by pregnancy or not. In the latter case the yellow bodies run through all their stages rapidly, and never reach a great development; these have been called *false corpora lutea.* They wither early; and, at the end of one or two months, only traces of them are found on the surface of the ovary.

Development.—The ovaries, like the testicles, are developed at the expense of a secondary blastema which forms upon the inner edge of the Wolffian body. They are relatively larger in the fœtus than in the adult. This great proportional development is especially observed in the length; for, instead of being ovoid, they are thin and flattened. The surface is perfectly smooth and polished. Placed outside the cavity of the pelvis, in the lumbar region, it seems analogous in this respect to the testicle. But this appears to be due simply to the want of development of the pelvis, the bladder and uterus being also as yet seated in the abdomen. At this period the ligament of the ovary is so little developed that the inner extremity of the ovary touches the corresponding border of the uterus. The ovarian follicles exist already in the fœtus; and, at the moment of birth, they are seen in very compressed layers throughout the whole cortical substance of the ovary. They are composed of a small rounded mass of granular substance, surrounded by a simple layer of cells. The stroma divides them into groups, separated from each other by bundles of connective tissue, which send finer prolongations between the follicles of each group. An extremely fine membrane bounds the follicles externally. On the inner surface is a layer of epithelial cells, each of which contains an elongated nucleus. The contents of the follicles consist of a finely granular substance in which is distinguished a spherical transparent vesicle. The ovaries are extremely small after birth, and undergo no change until the epoch of puberty. This epoch is more precocious for the ovaries than for the other genital organs. In girls of thirteen and fourteen years old, whose internal genital organs, and the uterus itself, still showed all the characters of the fœtal state, the ovaries had already acquired their full development: they were ovoid, soft, spongy, and full of blood.

At the epoch of puberty very important changes take place in the ovary, the merit of pointing out which is due to Négrier,* Gendrin,† Girdwood, Pouchet, Letheby,‡ Bischoff,§ and Raciborski. From the facts brought to light by these observers it results: 1st. That every menstrual period is accompanied in the ovary by a particular process, which appears to be limited to one Graafian follicle, which increases remarkably in size, raises and thins the fibrous investment of the ovary, and finally ruptures it. 2nd. That this rupture of the Graafian follicle has for its object to permit the passage of the ovule of Baër into the Fallopian tube. 3rd. That hence there takes place in woman, at every menstrual period, independently of any special cause, something analogous to the spontaneous oviposition of the Oviparæ. 4th. That the same phenomenon is effected in the females of the Mammalia at the time of heat. 5th. That the follicle of Graaf, immediately after its bursting, becomes the seat of a special process, which gives rise to the corpus luteum. 6th. That in consequence of the work of resorption in the corpus luteum, the follicle will be replaced by a slate-coloured cicatrix, which penetrates more or less deeply into the substance of the ovary. 7th. Lastly, that the cicatrices or scars on the surface of the ovaries and the corpora lutea, are not the result of follicles torn by the act of fecundation or of any erotic excitation, as Haller believed.

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* "Recherches anatomiques et physiologiques sur les ovaires de l'espèce humaine," &c. Paris, 1840.

† "Traité philosophique de Médecine pratique." Paris, 1839.

‡ "Philosophical Transactions," 1852.

§ "Zeitschrift für rationnelle Medicin," 1853.

The ovaries maintain, throughout the period of menstrual life, the development acquired at the epoch of puberty. Throughout this period, also, we meet with Graafian follicles in progress to maturation, so that the question arises: Do the vesicles, found in such multitude in the fœtus, continue without change until the time when they are roused to complete development, that is, from the age of fifteen to fifty? or are these first vesicles destroyed at the end of a certain time, to be replaced by others of more recent formation? Another question, not less interesting, is whether a single vesicle arrives at maturity at each menstrual period, or whether several accomplish their full development at the same time?

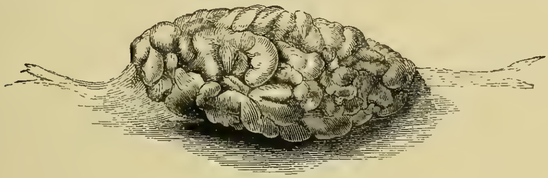

Fig. 8.
SHOWING OVARY IN OLD AGE—(AD NAT.) (R. B.)

These questions are not yet clearly solved. Sometimes several corpora lutea are found in the same ovary. If only a single vesicle were spent at each menstruation, it would take about 300 vesicles for the same number of menstruations, which, excluding the suspensions during pregnancy and suckling, take place during the reproductive period of life. Setting aside, therefore, the possibility of the new formation of vesicles, there exist in the ovary of the fœtus infinitely more vesicles than are wanted for all the purposes of reproduction. After the critical epoch the ovary is deprived of follicles. It shrinks, shrivels, and in old age loses its ovoid form, becomes flattened, atrophied, rough, knotted, and seems reduced to its shell (see Fig. 8).

Bischoff says that in every instance the full consequences of menstruation are not necessarily carried out, but that a follicle may swell and the ovum ripen without the bursting of the follicle or the escape of the ovum. Such a condition will cause sterility notwithstanding menstruation.

The ovaries, then, are the essential organs of generation. The destruction of one ovary by disease, or its loss by extirpation, does not entail sterility; but the destruction or loss of both condemns the woman to absolute sterility.

In connection with the history of the ovary, it is convenient to describe an organ immediately contiguous—*the organ or body of Rosenmüller.* This body is placed in the thickness of the broad ligament, between the outer extremity of the ovary and the last convolution of the Fallopian tube (see Fig. 3, p. 5). It is a small tubular organ to which Kobelt* gave the name of *parovarium.* It has been described with great care by M. Follin.† It is seen when the broad ligament is put on the stretch and held up to the light; but is made out more clearly by removing the thin peritoneal lamina which covers it. It is situated in front of the ovarian vessels; it is of triangular shape, the summit directed towards the ovary. It is generally composed of fifteen to twenty small tubes, slightly flexuous, of unequal length, from 0·12 inch to 0·20 inch in diameter, and separated from each other by a variable space. In the adult woman this collection of tubes is attached to the outer half of the ovary; in the fœtus at term, it corresponds to the upper border of this gland. One tube, that which occupies the upper border of the body of Rosenmüller, is distinguished from the rest as performing the part of a common excretory duct. In its middle it lies transversely; its two ends bend downwards at right angles, and are directed towards the upper border of the ovary. The other tubes spring perpendicularly from the transverse portion of the marginal tube, and converge slightly towards the ovary. In this course they are flexuous, of unequal calibre, and sometimes the seat of cystic or hydatidiform enlargements. Their ovarian extremity ends in a cul-de-sac. The wall of these tubes is composed of an outer investment formed of annular fibres; and of an inner tunic, having longitudinal fibres, and lined in its interior with a layer of vibratile epithelium. As an appendage to the organ of Rosenmüller, we must mention a vesicle more or less pedunculated, situated at the outer extremity of the broad ligament, and often adhering to one of the fringes of the pavilion of the Fallopian tube. This is the analogue of the vesicle of Morgagni in man. M. Follin has searched the broad ligament in order to find something analogous to the duct of Gaertner which is seen in some animals; but, like de Blainville, he has seen nothing resembling that which has been described by A. C. Baudelocque, Gardien, and others. It appears to be established that the organ of Rosenmüller is the remains of the Wolffian body, a transitory organ which very probably fulfils the functions of the kidney before the development of this gland.

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* "Der Nebenstock des Weibes." Heidelberg. 1847.

† "Recherches sur les Corps de Wolff." Thèse inaug. Paris, 1850.

THE FALLOPIAN TUBES.

The Fallopian or uterine tubes are truly *oviducts.* They are, in fact, the excretory ducts of the ovaries, differing, however, from all other excretory ducts in being entirely detached from their proper glands. They are situated in the thickness of the broad ligaments, and extend from the superior angles of the uterus to the sides of the cavity of the pelvis. Radiating from the same point spring two other structures—the round ligament in front, the ligament of the ovary behind. The Fallopian tube lies between at the highest margin of the broad ligament, occupying what has been called the upper or middle winglet of this structure; the round ligament occupies the anterior winglet, the ovarian ligament and ovary, the posterior winglet (see Figs. 2, 4, and 9). Floating in the pelvis between the ovaries which are behind, and the round ligaments which are in front, the tubes occupy the middle wing of the broad ligaments, of which they form the upper border; they run at first transversely outwards, and, just before terminating, bend downwards, backwards and inwards, to approach the outer end of the ovary, to which they are connected by a remarkable prolongation (see Fig. 4, p. 5). For the inner half of their course they are nearly straight, but usually describe in the rest of their length great flexuosities resembling the sinuous disposition of that part of the vas deferens which is nearest the epididymis. The broad ligament serves as a long mesentery to the oviduct, allowing it to perform very extensive movements. It is not rare to find the tube doubled up, either before or behind, and bound down by pathological adhesions. These accidental adhesions give to the pavilion of the tube a direction altogether different from the normal one. The tubes may be dragged into a hernia with the ovaries. And the uterus cannot change its position without drawing at least the inner end of the tube along with it. From its form the tube was likened by Fallopius to a trumpet; it begins from the uterus as a canal of extremely fine bore (see Figs. 2 and 4), gradually enlarges, and ends by an extremity opening out like a funnel, named the *pavilion* of the trumpet. The internal orifice, very narrow, leads into the uterine cavity; the outer orifice opens into the peritoneal cavity, and here presents the solitary example in the human organism of a direct communication between a mucous and a serous cavity. Around this free orifice, which is a little more contracted than the portion of tube immediately behind it, the pavilion is developed. This is a membranous prolongation surrounding the orifice as the corolla of a flower surrounds the stamens and pistils; it is cut or divided into fringes or irregular and folded festoons, whence the name of *fimbriated extremity*, or the quaint metaphorical designation of *morsus diaboli*. The largest of the fimbriæ are themselves subdivided or notched into smaller fimbriæ. To see this disposition well the tube must be plunged into water. The inner surface of the fimbriæ presents longitudinal or oblique folds, very prominent, and which are prolonged into the interior of the oviduct. The number and dimensions of the fimbriæ are very variable; sometimes they scarcely exist: then the edge of the pavilion looks simply festooned; sometimes they are very large, measuring as much as an inch in length, and are so numerous as to quite conceal the mouth of the oviduct. Often the base of the fimbriæ is pierced with holes. One fimbria is especially remarkable by its size; it constitutes the posterior part of the corolla, and numerous secondary fimbriæ are developed on its borders. It is turned down from within outwards, and is supported by a small ligament—the *tubo-ovarian ligament*—which extends from the pavilion to the outer extremity of the ovary, fixing the one to the other. A curious arrangement, described by Deville, is that this long and broad fringe is doubled up to form a channel open below and behind. According to Richard, the tubo-ovarian fringe is not constant. The oviduct may be divided into three portions: that which is contained within the uterine wall; the free portion or body of the tube; and the pavilion. The intra-uterine portion is about 0·4 inch long; it is straight, or describes a slight curve with an inferior concavity. Its cavity is uniform and very narrow; it prolongs outwardly the kind of horn or funnel, which the uterine cavity presents at its upper part, on either side. The orifice of communication between the uterus and the tube—*ostium uterinum*—is usually filled with thick mucus, which prevents liquid injected into the uterine cavity from passing into the cavity of the peritoneum. It forms a well-defined boundary between the uterine and the tubal mucous membrane. The first is smooth, polished, rosy, and pierced with numerous glandular openings; the second is pale, white, and folded in its longitudinal direction.

The *body of the oviduct* springs from the summit of the superior angle of the uterus, and is immediately embraced in the middle wing of the broad ligament; it is straight at its origin for about two inches; it then forms curves variable in degree and number, generally the more marked in proportion to the youth of the subject. These convolutions are independent of the peritoneal investment; they persist, even when the tube is inflated after being stripped. The inner or rectilineal portion of the tube is narrower than the outer or undulating portion. The first, sometimes called the *isthmus*, has a diameter of 0·8 in. to 0·12 in.; the second, which Henle calls the "*ampoule*," is slightly flattened from before backwards, and measures 0·25 in. to 0·30 in. in diameter or more. Often it narrows a little near its termination. The transition between the two portions is commonly very abrupt. The most external convolution of the tube presents a very constant arrangement; its convexity is directed upwards and outwards: in other words, the peripheral extremity of the oviduct is turned at first downwards, then backwards, so that the abdominal orifice looks backwards and downwards. Whilst the inner portion of the tube is scarcely large enough to admit a hog's bristle, the outer portion receives easily the extremity of a moderately-sized sound. The walls of the oviduct are in contact, and the cavity, completely obliterated, presents on transverse section the figure of a star, the rays of which penetrate between the numerous longitudinal folds of the mucous membrane. In the uterine portion of the tube the bore is capillary, and it is only with great trouble that one succeeds in seeing the *ostium uterinum* with the naked eye. The tube expanding on the one side into the cavity of the uterus, and on the other into that of the peritoneum, it follows that the two cavities communicate, a disposition which has favoured the development of peritonitis by permitting the passage of irritating

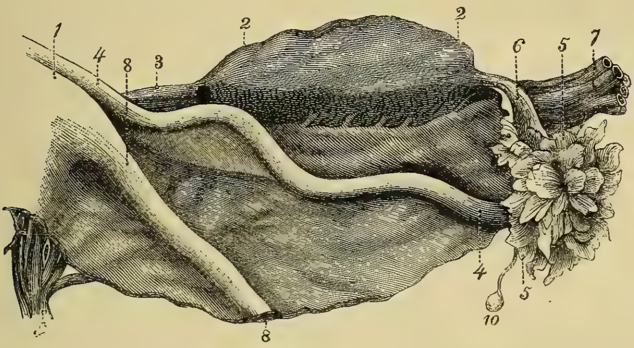

Fig. 9.

THE THREE WINGLETS OF THE BROAD LIGAMENT—(AFTER SAPPEY).

1, left side of the uterus; 2, 2, ovary; 3, its ligament; 4, 4, Fallopian tube; 5, 5, its pavilion; 6, fringe by which the pavilion is continued to the ovary; 7, utero-ovarian vessels; 8, 8, round ligament; 9, vessels of the uterus; 10, pediculated cyst attached to the fringe of the Fallopian tube.

matters from the uterus along the tubes into the peritoneal cavity. It is not rare to find the abdominal orifice obliterated. In such cases the tube is dilated in the form of a cone, with its base directed outwardly; its inflexions then become very marked. The whole *inner surface* of the oviduct is of a pale pink colour, and is marked by longitudinal folds of unequal sizes, which touch by their surfaces, converting the channel of the tube into a series of capillary tubes. These folds, always parallel to the axis of the tube, begin in the intra-uterine portion by two or three small ridges, and become more numerous and prominent at the inner portion of the body of the tube, and are developed to the greatest extent in the expanded portion of the canal (see Fig. 4). They project in variable degree: some scarcely rise above the level of the mucous membrane; others are 0·9 in. in height. On transverse section they sometimes resemble cæcal glands; at others, arborescent villosities. In the latter case, the principal folds are provided on both surfaces with secondary folds, which themselves may be covered with tertiary folds. Often, also, the surface of the folds presents linear reliefs, like projecting ridges, united together, and enclosing irregular spaces or pits. No valves are met with either in the course or orifice of the oviduct.

In its narrow portion the tube is firm to the touch, inextensible, and much resembles the vas deferens; in its large portion it is collapsed upon itself, and its walls are thin and extensible. Richard has observed small *supernumerary pavilions*, formed like the terminal pavilion by the mucous membrane of the tube cut up into fringes, and pierced by a hole opening into the canal. These are of interest in relation to the tubo-ovarian variety of ectopic gestation.

The tube is composed of three coats: an external, or serous; a middle, or muscular; and an inner or mucous coat. The peritoneum supplies the serous tunic, which adheres but loosely to the tube, and only surrounds three quarters of its circumference. The adhesion becomes closer at the level of the pavilion, the peritoneum of which clothes the outer surface, and is continuous with the mucous membrane at the free edge of the fringes. In the very loose cellular tissue which unites the serous coat to the muscular coat, small longitudinal muscular bundles are sometimes met with. The muscular coat of the oviduct forms a white membrane of dense and close texture. Richard and Robin have doubted the muscular character of the middle coat. It is affirmed, however, by Kölliker. Dr. Arthur Farre has found well-marked, smooth, muscular fibres in the genera, Simia, Bos, Cervus, and in the pregnant dolphin, and also in the human female during middle life. It is composed chiefly of annular fibres: on its surface some bundles of longitudinal muscular fibres, which seem to proceed from the muscular fibres of the uterus, are attached. Where the tube traverses the uterine wall, the muscular coat of the oviduct preserves its own character quite distinct from that of the uterus.

Sappey describes two muscular planes: one, longitudinal, a prolongation from the fibres of the uterus; it extends from the uterus to the fimbriated extremity. The other plane is circular; it is proper to the tube; it surrounds the tube like a sphincter from end to end.

The *mucous coat,* which alone forms the numerous folds of the inner surface of the oviduct, presents a *fundamental stratum* formed by connective tissue and longitudinal muscular fibres, and by a *vibratile or ciliated epithelium.* It contains neither glands nor villi. The cilia which cover the free surface of the cells execute movements the effect of which is to carry on liquids and the ovum to the uterine cavity. This is one function of the tube; the other is to receive and transmit towards the ovary the fecundating principle of the male. If the tubes are closed by ligature or by disease, sterility is the consequence. The ovum may be fecundated and arrested in the tube, and be developed there, constituting tubal gestation. The pavilion of the tube is charged with the duty of embracing the ovary at the moment of dehiscence of the Graafian follicle, and of applying itself closely to the point whence the ovum detaches itself. Hence it follows that any adhesion of the ovary or of the tube which prevents this relation is a cause of sterility. The Fallopian tubes, like the uterus and vagina, result from the development of the canals of Müller, which stretch over the surface of the Wolffian bodies, with which they have no connection, and terminate at the pedicle of the allantois, uniting together in the median line. At first, the uterine tubes are relatively more developed than the body of the uterus; so much so that they seem to be continuous one with the other at their uterine ends. They preserve this relative development until the epoch of puberty, gradually departing from the type of the lower animals in which the uterus is represented by two horns.

THE UTERUS.

The Uterus (*utriculus, a bag*) is the organ of gestation and of parturition. It is a hollow organ possessing thick muscular walls, destined to receive the fecundated ovum; to supply to it the materials necessary for its development; and to expel it when mature.

The uterus is *situated* in the cavity of the pelvis, in the median line between the bladder and the rectum, beneath the mass of intestines, and above the vagina (see Fig. 10). It is held in its position, slung or suspended by different folds of the peritoneum and by muscular bundles, principally situated in these folds. Closely connected also with the bladder, Fallopian tubes, rectum, and vagina, these structures all concur in maintaining the position of the uterus. The *ligaments* of the uterus are six in number, three on each side; namely, the broad ligaments, the round ligaments, and the utero-sacral ligaments (see Fig. 2).

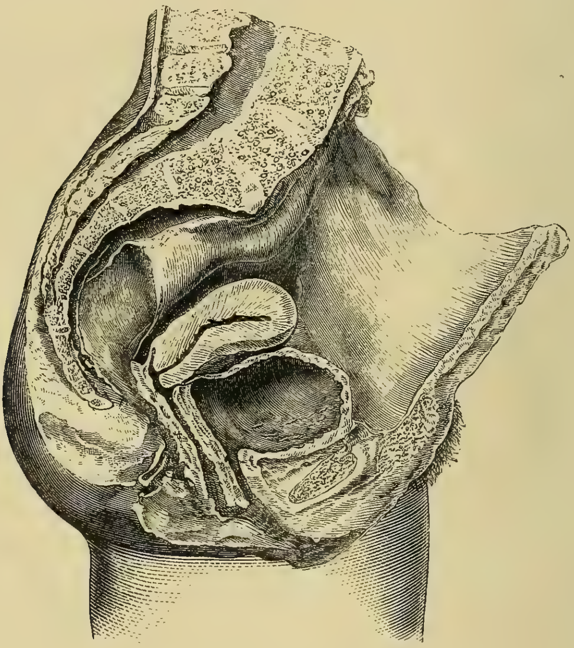

FIG. 10.

LONGITUDINAL SECTION OF THE PELVIS, MADE AFTER FREEZING—(AFTER BREISKY).

The broad ligaments are two folds, formed by the peritoneum and stretched across the cavity of the pelvis, extending from the borders of the uterus to the sides of the pelvis, and thus, with the uterus suspended between them, forming a septum which divides the pelvis into two parts. The broad ligaments are of quadrangular form, their inner border is attached to the border of the uterus, or, more correctly speaking, the two laminæ which form them separate to receive the uterus in the space between them. It is to be remarked that the broad ligaments are attached on a level with the anterior aspect of the uterus, so that the whole thickness of the uterus lies behind the ligaments. Their external border is continuous with the peritoneum which lines the pelvic cavity. At the level of their inferior border the two laminæ of the broad ligaments separate to line the floor of the pelvis; a loose cellular tissue, including very little fat, is interposed at this level between the laminæ, and unites them to the superior pelvic fascia. This cellular tissue is directly continuous with that which is found on the sides of the vagina and rectum below; in the iliac fossa laterally, and around the bladder in front, it also communicates through the sciatic notch with the deep cellular tissue of the nates. This disposition is of importance to bear in mind in the study of the collections of blood and pus which may form in this region. The upper border of the broad ligaments is divided on either side into three secondary folds, formed, the posterior one by the ovary and its ligament, the anterior one by the round ligament, and the third or middle one by the Fallopian tube. It is this arrangement which has caused the broad ligament to be likened to the wing of the bat (*ala vespertilionis*). (See Figs. 2 and 4.) The middle fold or winglet is the largest and the highest, and constitutes the true upper border of the broad ligaments. These ligaments are formed of two peritoneal laminæ and by an intermediate layer of cellular tissue, in which run the numerous vessels and nerves belonging to the uterus and ovary, as well as a multitude of muscular fibres springing from the uterus. They also enclose the remains of the Wolffian body or organ of Rosenmüller. The *muscular fibres of the broad ligament*, according to M. Rouget, all rise from the sides of the uterus, and are directed towards the wall of the pelvis. Forming a thin sheet-like expansion it has been likened to the platysma myoides.

The *cellulo-vascular layer* between the peritoneal folds is thin superiorly, but widens from above downwards and outwards; so that at the level of the floor of the pelvis and of the sides of the uterus it attains its greatest thickness. It is traversed by: 1, the uterine artery and its first divisions, which spread out like a fan on the sides of the uterus, where they anastomose; 2, the uterine vein, the principal branches of which form at the sides of the uterus a voluminous plexus; 3, by lymphatic vessels and nerves. The fibres do not form a continuous layer, but their bundles of various sizes form a kind of lace-work or open canvas, mixed with the vascular and nervous net-works, the whole covered and masked by connective tissue.

M. Rouget describes the uterus and its appendages as being enclosed in a broad muscular membrane, of which the peritoneal ligaments are a dependency. The broad ligaments do not prevent the uterus from inclining backwards or forwards. M. Richet says they oppose flexions of the body on the neck. Although never fully on the stretch, they resist lateral deviations of the uterus; but their power in this way cannot be great. They allow the uterus to be sensibly lowered without being dragged.

The structure of the *round ligament* has been carefully examined by Mr. Rainey.* He says it is a muscle rather than a ligament, and he has shown that it consists principally of striped or voluntary muscle. It arises by three fasciculi of tendinous fibres; the inner one from the tendon of the internal oblique and transversalis muscle near to the symphysis pubis, the middle one from the superior column of the external abdominal ring, near to its upper part, and the external fasciculus from the inferior column of the ring just above Gimbernat's ligament. From these attachments the fibres pass backwards and outwards, soon becoming fleshy; they then unite into a rounded cord, which crosses in front of the epigastric artery and behind the lower border of the internal oblique and transversalis muscles; it then gets between the layers of the peritoneum forming the broad ligament, along which it passes backwards, downwards, and inwards to the anterior and superior parts of the uterus, into which its fibres, spreading out a little, may be said to be inserted.

The striated muscular fibres are not confined to the surface of the round ligament, but form almost the whole of its substance, and are more particularly distinct near to its centre; nor do they extend completely to the uterus, but after passing between the layers of the broad ligament to about an inch or an inch and a half from its superior part, they gradually lose their striated character, and degenerate into fasciculi of granular fibres mixed with long threads of fibro-cellular tissue.

Mr. Rainey found a similar structure in the monkey, dog, sheep, and cow. The round ligaments contain also numerous vessels, also some nerves and absorbents. The arterial trunks are large, but the capillaries, into which they ultimately divide, have the same size and arrangement as those of ordinary muscle. The lymphatics are situated on the outer side of the ligament: their glands are sometimes of considerable length, and even pass through the external abdominal ring; connecting all these parts together, there is a considerable quantity of areolar tissue, especially where the striated muscular fibres are absent, or are about to terminate.

Mr. Rainey, reasoning from the structure of the round ligaments, says the presence of voluntary muscular fibre proves that they are not fitted to serve as mechanical supports to the uterus; but that their real use is in some way or other to act in copulation. Considering the position of their points of attachment and the direction of their fibres, it is evident that their combined action will bring the uterus nearer to the symphysis pubis, and thus tend to draw it somewhat from the vagina, in this way tilting the os uteri upward and backward. Now the only way in which it can be imagined that these changes assist in sexual intercourse, is by their causing the semen to be attracted into the upper part of the vagina and vicinity of the os uteri. This opinion, as to the use of the round ligaments, had been enunciated by Velpeau and Maygrier.

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* "Philosophical Transactions," 1850.

The round ligaments also contain a great number of vessels, especially veins, which may become varicose, especially after many pregnancies, says Cruveilhier, particularly at the level of the external orifice of the inguinal canal, where they have sometimes simulated a hernia. The artery comes sometimes (Sappey) direct from the epigastric, but most frequently from the cremasteric. It is continued to the uterus, to which organ it is principally devoted. From it spring numerous arterioles, which lose themselves in the muscular bundles. In the fœtus, and occasionally even after birth, the round ligaments are accompanied in the inguinal canal by a prolongation of the peritoneum, quite analogous to that which accompanies the spermatic cord. This diverticulum, known under the name of the *canal of Nuck,* sooner or later becomes obliterated. But sometimes this obliteration does not take place, and this explains the frequency of inguinal hernia in women. The round ligaments are never on the stretch, and cannot resist displacements of the uterus.

The anterior or *utero-vesical ligaments* are two lateral folds of peritoneum, containing bundles of fibrous tissue. They are found where the peritoneum is reflected forwards on to the bladder, opposite the point of junction of the body and neck of the uterus, and from the lateral boundaries of the utero-vesical peritoneal pouch.

The *posterior* or *utero-sacral ligaments* extend from the lower part of the body of the uterus to the outer sides of the sacrum, enveloped by peritoneum; they form two semi-lunar or falciform folds—the folds of Douglas; their inner borders are concave and sharp, and pass on to the sides of the rectum, forming an oval opening, which leads to a cavity formed by the recto-vaginal depression of the peritoneum. These ligaments, and the pouch between them (Douglas's sac), are well seen when the uterus is drawn forwards. The utero-sacral ligaments are composed of smooth muscular fibres, which spring from the uterus, and of a peritoneal investment. The experiments of Malgaigne seem to demonstrate that these ligaments constitute the principal obstacle to the falling of the womb towards the vulva. When traction is made upon the cervix uteri, these ligaments are immediately seen to be tightened; when divided, the uterus sensibly drops, but is soon arrested by the broad ligaments and the resistance of the floor of the pelvis, chiefly by the floor of the peritoneum, which is reflected from the walls of the pelvis over the bladder, uterus, and rectum. M. Richet believes that the utero-sacral ligaments further serve to prevent the uterus from being driven forwards upon the bladder, thus preserving this organ from the severe compression to which it would otherwise be subjected.

Notwithstanding the pathological interest attaching to the so-called *Douglas's pouch,* its anatomical features have been very imperfectly described. Led first by clinical observations, it appeared to me that the lowest part of the pouch was not directly behind the uterus and vagina, but distinctly on the left side. This has been completely confirmed by observations on the dead body, in which I have been assisted by Dr. Ewart, curator of the museum at St. George's Hospital. We find that on the right side, that is, behind the right ovary and right broad ligament, the pouch is very shallow, scarcely more than an inch deep; that, dipping obliquely towards the left, it descends behind the uterus and the upper part of the vagina; and that, still dipping, it attains its greatest depth quite on the left of the uterine neck and vagina, so that it partly lies not only behind these organs, but partly on the left upper fourth of the vagina. Thus behind the left ovary and broad ligament the sac is mainly situated, being here often three inches or more deep. All these points are demonstrated by measurements, casts, and dissections. I have referred to this anatomical question in a memoir in *St. George's Hospital Reports,* 1877, entitled, "A Clinical Study of Retro-uterine Tumours." It is chiefly in elderly women, and under presumed pathological processes that the pouch is found of equal depth on both sides. In this memoir, and in subsequent parts of this work, illustrations of the pathological import of this pouch will be found.

When the uterus is lowered, attended by a corresponding degree of vaginal inversion, this pouch always goes along with it, so that in complete procidentia and inversion of the vagina the pouch will be external to the vulva behind, whilst the base of the bladder will be outside in front.

The extent and directions of movement of which the uterus is capable forms an important subject of study. The first question to determine is, What is *the normal position of the uterus?* A line drawn from the upper margin of the symphysis pubis to the lumbo-sacral articulation will strike the upper margin of the fundus of the uterus. Another line drawn from the lower border of the symphysis pubis to the lower margin of the fourth sacral vertebra, will touch at its middle the point of the cervix (see Fig. 1).

The *movements* of the uterus are limited by its connections, and are influenced by the changes of condition of the surrounding organs. The greatest amount of mobility is enjoyed by the fundus. The cervix, being bound to the bladder and vagina, enjoys a more limited amount of motion. The fundus may be thrown backwards or forwards, and thus acting as a lever it will throw the os in the opposite direction. The fundus does not move round the os exactly as upon a pivot, but the os is projected a little forwards or backwards whenever the fundus moves in the opposite direction. Distention of the bladder will throw the fundus backwards; loading of the rectum will press the fundus forwards and downwards. In retroversion of the fundus of the uterus, enlarged by gestation or other causes, the cervix may be driven so firmly against the symphysis pubis as to close the urethra; and as the base of the bladder to which the cervix uteri is attached has a certain amount of mobility, in anteversion of the body of the uterus, the cervix may be carried back close to the promontory of the sacrum, dragging the attached wall of the bladder with it. But the upward mobility of the part of the bladder to which the cervix is united is limited; hence it happens that when the fundus is thrown backwards, the cervix held down in some degree by its vesical attachments, becomes bent, so that the os looks downwards, instead of being projected forwards exactly in a line with the axis of the fundus.

The whole uterus may be driven forwards closely behind the pubes. This takes place when a solid body gets into Douglas's pouch behind the uterus. The chief bodies so acting are, small ovarian tumours, dermoid cysts, extra-uterine gestation cysts, and intra-peritoneal blood-tumours or hæmatoceles. A fibroid springing from the posterior wall of the uterus may produce similar displacement.

In addition to the backward and forward or see-saw movement, the uterus may move to either side. Here again it is the fundus especially that is displaced. These lateral movements are restricted somewhat by the broad ligaments. It must, however, be remembered that there exists commonly a certain lateral obliquity.

Another movement is upwards or downwards. The pressure of the abdominal viscera may carry down the entire mass of the pelvic viscera towards the perineum, or the uterus may be elevated slightly by upward pressure on the cervix.

Some amount of alternate elevation and depression of the uterus takes place normally, under the influence of respiration and of voluntary muscular exertion. On inspiration the entire mass of abdominal viscera is forced downwards, pressing the uterus before it. On expiration there is a general movement of collapse towards the centre of the body, under the influence of atmospheric pressure. This of course bears most directly upon the external soft parts. The perineum and vulva are pressed inwards, and the uterus rises towards the abdomen. Under the influence of defecation, again, or of any powerful muscular exertion in which the chest-walls are fixed, the uterus is driven downwards; sometimes, indeed, so violently that complete prolapsus has been thus induced. I have known complete prolapsus of the uterus occur in a virgin, under the violent efforts of epileptic convulsions. The descent of the uterus, anterior wall of the vagina, and base of the bladder, is very obvious, if vomiting or coughing occur during an examination by speculum. The instrument is easily driven out, as the os uteri is often brought quite down to the vulva. This observation proves that the so-called ligaments of the uterus exert but a small influence in preventing prolapsus.

All these movements may be verified by manual examination. By placing the tip of a finger of one hand on the os uteri, as in examination *per vaginam*, and applying pressure upon the fundus, by the other hand, through the abdominal wall above the pubes, the cervix may be felt to move about according to the direction of the pressure applied by either hand.

The True Axis of Movement of the Uterus.—The centre around which the chief movements take place is, of course, its most fixed point. This is the anterior part of the supra-vaginal portion of the cervix which is closely connected with the base of the bladder (see Figs. 1 and 10). At this part the uterus is held, whilst its two extremities, body and vaginal portion, are free. Hence the movements of which the uterus is capable are relative and general. The first order of movements are those in which the uterus inclines backwards or forwards, or to either side. The second order, or those in which the uterus moves upwards and downwards, can only be accomplished simultaneously with corresponding movements of the base of the bladder. The organs move *en masse*, preserving more or less completely their relative positions, as when the rectum is distended by fæcal accumulations, or, when empty, it retreats.

The Direction of the Uterus.—The longitudinal *axis* is directed obliquely from above downwards and from before backwards, that is, it is nearly coincident with the axis of the brim of the pelvis, and forms with the axis of the vagina an obtuse angle. It follows that the fundus of the uterus looks upwards and forwards, its apex, or the os, backwards and downwards (see Fig. 10). This, the normal direction, is, however, subject to variations, which cannot be always regarded as of pathological significance.

As a general fact, it is to be observed that the connections of the uterus are loose and extensile, and permit the organ to float in the cavity of the pelvis, performing more or less extensive movements. The ease with which the uterus can be drawn down towards the vulva in certain surgical operations, and the displacement which it undergoes during pregnancy, when it rises into the abdomen, are proofs of its great mobility. This property is turned to account to facilitate exploration, and the detachment of the ovum in cases of hæmorrhage in abortion. For these purposes strong pressure is made upon the fundus by the hand applied to the lower part of the abdomen.

There is one deviation from the standard axis of the uterus which appears to be nearly constant; it is that in which it takes an oblique direction from right to left. It is thought to depend upon the presence of the rectum on the left side of the pelvis. Boulard, Verneuil, Follin, H. Bennet, Richet, Aran, and others, have made very precise observations, which establish the fact that the uterine axis is not a straight but a curved line, that it is bent about the middle, presenting an anterior concavity. In introducing the uterine sound it is therefore proper to give a small curvature to the instrument, and to make the point describe a gradual curve forwards after passing the os uteri externum.

In the human subject the uterus is single; in most animals it is double. The so-called double uteri observed in the human species are in reality only bifid or divided uteri, depending upon an arrest of development. The bifid character may be limited to the body, or may extend to the cervix, and even to the vagina. The uterus may even be absent. In one case I failed, after the most minute exploration, to discover a trace of such an organ. But most commonly, where dissection has been instituted, a rudimentary uterus has been discovered between the rectum and the bladder.

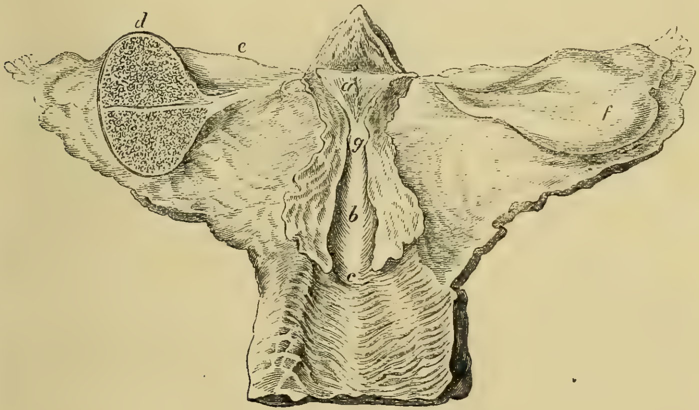

Fig. 11.

UTERUS AND APPENDAGES OF AN INFANT—(AFTER A. FARRE).

a, cavity of body laid open; *b*, cavity of cervix; *c*, anterior lip of the cervix; *d*, left ovary opened; *e*, Fallopian tube; *f*, right ovary; *g*, internal os uteri, marking the division between the body and cervix.

The abnormal forms of the uterus will be described with its pathological conditions.

The *size* of the uterus varies according to the age and certain physiological conditions. It is very small before puberty, the neck much predominating over the body (see Fig. 11). When menstruation sets in it grows greatly, and it enlarges a little at every period, returning during the intervals to the ordinary size. Pregnancy exerts a more durable influence; after delivery the uterus commonly retains an increased bulk. In old age the uterus shrinks, so that it is sometimes reduced to the size presented in new-born children.

The development of the uterus is sometimes imperfect. It may retain the dimensions and other characters of immaturity. This imperfection may bear upon the body or upon the cervix. In the latter case, the part which projects into the vagina is often more conoid than natural, and the os externum is a very small round opening which barely admits the uterine sound. In these cases there is also commonly present a greater curvature of the uterus, sometimes amounting to angulation at the union of the body and cervix. This condition is usually associated with sterility, dysmenorrhœa or menorrhagia, sometimes amenorrhœa, and it may even lead to menorrhagic effusions into the peritoneum, by opposing the free natural exit of the menstrual fluid.

The *weight* of the uterus in girls at the age of puberty is from 360 to 1,000 grains; from 1,200 to 1,800 grains, in women who have borne children; it may be reduced to 100 or 200 grains in old women. At the term of gestation it may weigh from 26 ounces to 52 ounces.

The *shape* of the uterus is that of a pear, or rather of a cone flattened from before backwards; it is divided into *body* and *neck*. A narrowing, or *isthmus*, marks the boundary between these two parts. This isthmus is very marked in infants; it diminishes sensibly at puberty, and is still more indistinct after several pregnancies. The vagina being inserted on to the neck of the uterus divides it into a *vaginal portion* and a *supra-vaginal portion* (see Fig. 1).

In the ordinary state the uterus is soft enough to take the impressions of the organs which press upon it. This was shown by Depaul to the Paris Anatomical Society in 1854. After death marked rigidity of tissue occurs. If steeped in water at 90° F., it recovers some of its natural softness, and resumes its erectness. When it is bent, if it is injected without over-distending its vessels, it is seen to swell, and its axis then becomes quite rectilinear. Hence the uterus is easily distorted after death. Thus, the sections taken after freezing must be accepted with the corrections indicated by the different influences of life and death.

To study the uterus thoroughly, it is necessary to describe two surfaces, the anterior and the posterior; two lateral borders, an upper border or *fundus*, and an inferior extremity, perforated, projecting into the vagina, called the *vaginal portion of the neck*, with the *os tincæ*.

In its upper three-fourths the anterior surface is slightly convex, and smooth like all parts covered with peritoneum, and is in relation with the posterior surface of the bladder, from which it is often separated by coils of small intestine. When the bladder is full, the uterus is pushed away from the anterior abdominal wall; hence the precept, always to empty the bladder before exploring the uterus through the abdomen. In its lower third the anterior surface of the uterus is in direct relation with the base of the bladder, to which it is united by a loose cellular tissue. This relation explains the frequency with which cancerous affections of the uterus spread to the base of the bladder. This portion of the pelvic cellular tissue is also especially liable to become inflamed from injury received during labour, and to be the seat of abscess (see Fig. 12).

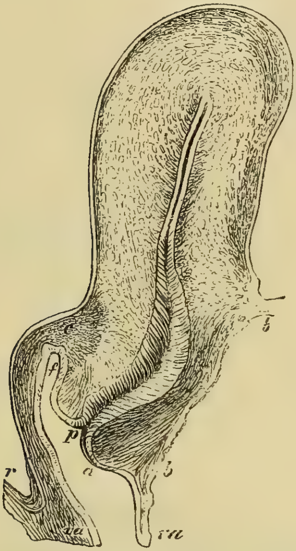

FIG. 12.

VERTICAL SECTION OF THE UTERUS PARALLEL WITH ITS LATERAL BORDER—(AFTER A. FARRE).

a, anterior; *p*, posterior, lip of cervix; *i*, internal os uteri; *va*, vagina; *f*, fornix, or posterior pouch of fundus of vagina; *c*, loose connective tissue immediately above the fornix; *r*, point of posterior reflection of the peritoneum on to the rectum, forming the retro-uterine pouch or space of Douglas; *b*, *b*, line of attachment of the cervix to the bladder. The peritoneum ceases at the upper *b* in front.

The posterior surface of the uterus is covered by peritoneum throughout its whole extent. It is in mediate relation with the anterior surface of the rectum, from which it is said to be often separated by folds of small intestine. But Claudius of Marburg* says that in the living subject the uterine sound passed into the uterus may always be felt by the finger in the rectum, showing that Douglas's sac is not filled by intestine. In the dead subject frozen, the uterus with its broad ligaments and ovaries is mostly found lying as close to the posterior wall of the pelvis as the lungs are to the ribs. The rectum passes close by the left border of the body of the uterus. Having examined sections of many frozen subjects, he concludes that there is always anteversion, anteflexion, or antefraction of the uterus when intestinal loops are present in Douglas's sac. My own observations confirm those of Claudius. The anterior and posterior walls of Douglas's sac are always in close apposition in the normal condition. It is a potential sac.

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* "Med. Times and Gazette," 1865.

The posterior surface is more convex than the anterior, and can be explored by the finger introduced into the rectum.

The lateral margins of the uterus are slightly concave, thick, and situated between the two laminæ of the broad ligaments. They are in relation with the trunks of the uterine arteries, the venous plexuses, the nerves, and the cellular tissue confined within the thickness of the broad ligaments. This cellular tissue is the frequent seat of inflammation and abscess after labour.

The upper border or *fundus* is convex, thick, rounded, and forms the base of the flattened cone which the uterus represents. Clothed with peritoneum, and covered with the coils of the small intestine, the fundus of the empty uterus never rises to the level of the brim of the pelvis; it is therefore only in the diseased state or during pregnancy that it is possible to feel it by the fingers applied to the hypogastrium. In the imparous woman the upper border is nearly straight, and on a level with the Fallopian tubes; after one or more pregnancies, it always remains convex, being more raised in the middle than near the origin of the tubes.

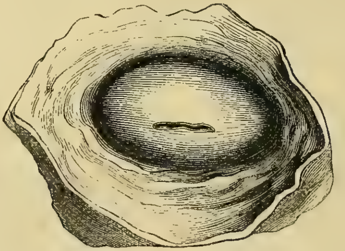

FIG. 13.

VIRGIN OS UTERI AND VAGINAL PORTION OF THE CERVIX—(AFTER A. FARRE).

The *inferior extremity* of the uterus is the apex of the uterine cone. The *os tincæ*, or vaginal portion, has the form of a rounded cone. It usually projects 0·25 in. to 0·5 in., but in certain pathological states it may be lengthened so as to reach the vulva or even to protrude externally. Caseaux says the length of the vaginal portion diminishes in proportion to the number of pregnancies, and may even disappear altogether in women who have had many children. But this disappearance is commonly due to senile atrophy. The apex is pierced by an opening which leads to the cavity of the uterus. This opening, the *os externum uteri,* or *os tincæ,* looks a little backwards. In the virgin it is a small transverse fissure, sometimes round, bordered by two lips, one anterior, the other posterior, both smooth, the anterior being thicker and more prominent than the posterior (see Fig. 13). To the touch, says Cruveilhier, the os tincæ gives the same sensation as the lobule of the nose. At the menstrual epoch the neck is a little gaping. In women who have had children the os externum uteri represents a larger fissure, often large enough to admit easily the end of the index finger; the lips are thicker, uneven, and often present notches, the remains of the rents they have undergone during labour. Of these notches one is almost always seen towards the left commissure, which is explained by the frequency of the left occipito-anterior position of the child's head in labour.

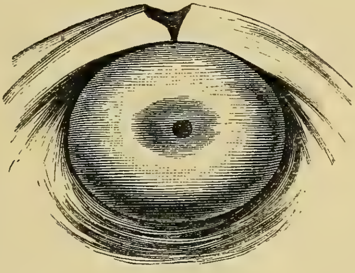

Fig. 14.

THE OS UTERI IN OLD AGE.

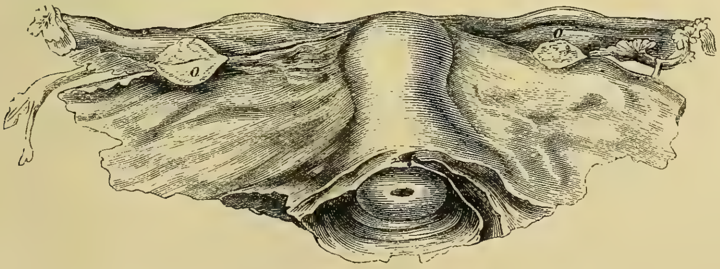

Fig. 15.

THE UTERUS IN OLD AGE (AFTER A. FARRE),

Showing a return to the infantine proportions between the body and cervix; half natural size; *o*, *o*, the shrivelled ovaries.

Sometimes the portion of the uterus which projects into the vagina quite disappears. The vagina then terminates in a cul-de-sac, at the bottom of which is felt only a contraction separating the cavity of the vagina from that of the uterus. This condition is most frequent in old age.

The Cavity of the Uterus.—The uterus is hollowed by a cavity very small in proportion to the volume of the organ. Excepting during pregnancy, and certain morbid states, the walls of this cavity are always in contact. It represents an irregular canal, divided by a sort of hour-glass constriction in the middle into two parts: the one upper, flattened out transversely, is *the cavity of the body of the uterus;* the other, inferior, fusiform, is *the cavity of the neck of the uterus.* The constricted part which separates the two cavities is the *os uteri internum*, or isthmus of the uterus (see Fig. 1).

The cavity of the body is triangular, and has an orifice at each angle: one inferior, which communicates with the cavity of the cervix, and one at each upper angle, which lead to the Fallopian tubes. The uterine orifices of the tubes are situated at the bottom of the funnel-shaped cavities, which are vestiges of the primitive division of the body of the uterus into two halves or horns. This bifidity, normal in the lower animals, is sometimes observed in the human species. The three borders

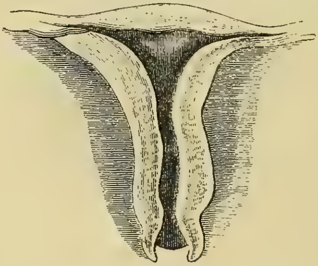

Fig. 16.

HALF NATURAL SIZE. SHRINKING OF THE WALLS IN OLD AGE, AND RETURN TO THE TRIANGULAR FORM OF THE INFANTINE AND UNDEVELOPED UTERUS—(AFTER A. FARRE).

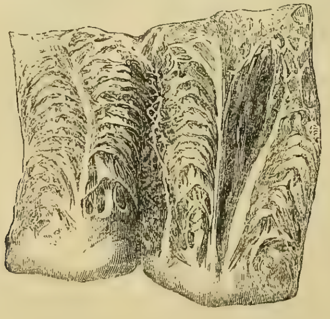

Fig. 17.

NATURAL SIZE OF CERVIX LAID OPEN—(AFTER HASSALL AND TYLER SMITH).

of the uterine cavity are convex inwards. In the multiparous uterus the cavity of the body is more developed, its borders are less convex, or nearly straight, the upper angles are enlarged, and the cavity of the neck has lost in length. The cavity of the neck of the uterus is cylindroid; flattened from before backwards, slightly enlarged at the middle, it presents on either wall rugæ, or elevations, forming a tolerably regular series, known as the *lyra*, or *arbor vitæ* (see Fig. 17). On each of these walls is distinguished a vertical column running along the entire length of the neck, swelling out above and continuous with the median column of the body of the uterus. The two columns of the neck do not descend quite so low as the os externum, but stop a little above the circle of the orifice, which is always smooth (see Fig. 17). M. Guyon has observed that these columns are never situated exactly on the median line; the anterior one is a little on the right, the posterior one a little on the left; so there results a kind of dovetailing of the walls of the neck, especially marked at the upper part of the cavity. From the two borders of each column a certain number of smaller folds proceed, at more or less acute angles, and are directed upwards and outwards, resembling a fern leaf. These oblique folds have their free border directed downwards, and enclose furrows or pits, in which are seen the gaping orifices of the uterine glandules. Sometimes they bifurcate. The arbor vitæ is commonly much smoothed down after the first labour But this is not constant, since the arbor vitæ is sometimes found intact after several labours.

The *isthmus* is generally 0·20 in. to 0·25 in. long: 0·16 in. across, and 0·12 in. from before backwards in imparous women. In multiparæ the length of the isthmus, which is always included in the measurement of the body, is reduced to 0·16 in. and even less. The uterine sound is commonly arrested by the constriction of the isthmus, and only penetrates it under a certain pressure. After the cessation of menstruation the isthmus contracts considerably, and often is completely obliterated. The orifice of the os externum also I have frequently found obliterated in old women. M. Guyon says this obliteration always coincides with the obliteration of the isthmus. This, however, I have found to be far from constant.

The inner surface of the body of the uterus is much more vascular than that of the neck. This difference is especially marked in women who have died during menstruation. The *walls of the uterine cavity*, apart from pregnancy, are 0·40 in. to 0·60 in. thick. The thickness is greater in women who have had children than in the virgin. The thinnest part corresponds with the insertion of the tubes. The walls of the neck are thinner than those of the body.

The *dimensions* of the uterus have been determined by M.

Richet in the following manner:—The uterus remaining intact he first measured the cavity by the sound, then having removed the uterus from the pelvis, he split it from before backwards along the median line, and measured it again from the neck to the fundus of the uterine cavity first, and then from the neck to the upper border of the organ. He obtained the following dimensions:—

	In the virgin.	In women.	In mothers.
The vertical diameter of the uterus	2·20 in.	2·52 in.	2·72 in.
Vertical diameter of the cavity	1·80 in.	2·20 in.	2·44 in.
Transverse diameter of the uterus	1·24 in.	1·80 in.	1·90 in.
Transverse diameter of the cavity	0·60 in.	1·08 in.	1·24 in.

Good standards are so important that the following tables are added.

The subjoined measurements are given by Sappey:—

	Virgin.	Nulliparæ.	Multiparæ.
Length of uterus	2·35 in.	2·50 in.	2·70 in.
Width	1·50 in.	1·55 in.	1·70 in.
Thickness	0·85 in.	0·90 in.	1·00 in.

To these it is useful to add the measurements of other observers:—

		Huschke.	P. Dubois.	Richet.	Aran.
Length	Nulliparæ . .	2·70 in.	2·70 in.	2·50 in.	2·80 in.
	Multiparæ . .	3·60 in.	2·90 in.	2·70 in.	2·75 in.
Width	Nulliparæ . .	1·55 in.	1·75 in.	1·70 in.	1·65 in.
	Multiparæ . .	2·35 in.	1.90 in.	1.85 in.	1.25 in.

Huschke's long diameter is manifestly erroneous; it must have been taken from a specimen in which the involution-process after pregnancy had not been completed. Dubois's is also somewhat exaggerated. Sappey confirms Richet, whose observations included forty women from eighteen to fifty years old.

Comparing the three diameters in virgins, nulliparæ, and multiparæ, it is seen that they increase but little in passing from the first column to the second, and that they lengthen sensibly in passing from the second to the third. The influence, therefore, of pregnancy is manifest; that of coitus is much less pronounced. Rouget showed that when the whole vascular system of the organ is injected, its dimensions are often more than doubled. The turgescence attending ovulation is not so great; but it is greater than is commonly thought. Under the influence of this congestion its two faces become more convex, its border is thicker, the whole organ becomes rounded, so that its increase bears more upon the transverse and antero-posterior diameters than upon the vertical.

In estimating the above measurements borrowed from Sappey and others, it must be borne in mind that they were made on organs removed from the body, and consequently wanting the turgor of vascular activity. The extent of the shrinking thus endured is difficult to determine; but it is certainly considerable. During life the sound commonly gives 2½ in. as the length from the lower border of the os externum to the internal aspect of the summit of the body of the uterus. To this we may generally add ½ in. at least as the thickness of this part, making quite 3 in. as the life size of the organ, to compare with barely 2¼ in. as the size after death, represented in Figs. 12—18.

There are two purposes for which it is desirable to settle the standard normal uterus in the several states of virginity, nulliparity and uniparity, or multiparity. The one is for clinical use, the other for forensic application. For the first purpose the data quoted are sufficiently precise.

M. Guyon,* as well as Richet, has examined the uterus at the different physiological epochs, and both find that the uterus attains its maximum during the menstrual periods, and its minimum in the intervals. It is important in practice to bear in mind that during the five or six days which precede and follow the catamenia, the uterine diameters will generally exceed the means, whilst during the intermediate period they will fall a little below.

The vertical diameter of the uterus is divided unequally between the body and the neck. In the virgin the longest portion belongs to the neck. In multiparous women, the two diameters are nearly equal, the difference, if any, inclining in favour of the body. In multiparæ the body continues to grow, whilst the neck has undergone an absolute or comparative shortening, which reduces its vertical diameter in some cases below that of the body (see Fig. 18).

The shape of the cavities of the body of the uterus and of its cervix, and the relations of their walls, are best demonstrated by longitudinal sections, and by transverse sections made at different points.

If we first make a vertical section in the antero-posterior direction, as in Figs. 12 and 19 B, we see that the walls of the body of the uterus lie in contact. The cavity is represented by a line running from the fundus to the cervix. This cavity is, under ordinary circumstances, potential rather than actual. But when fluids are retained, or a solid body is introduced into or grows in the space between the two walls, the cavity is capable of enlarging to an almost indefinite extent. This enlargement of the cavity is always, at least when considerable, effected chiefly by gradual growth of the uterine walls. When the uterus is emptied this growth ceases, a process of absorption and involution takes place; and generally the triangular form of the cavity is resumed, the anterior wall being again flattened upon the posterior. Where any distinct hollow remains, it may be assumed that there is more or less habitual retention of fluids, and that there is some pathological condition of the mucous membrane or wall of the uterus, or obstruction at a lower point of the canal.

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* "Études sur les cavités de l'utérus," thèses inaug. 1858.

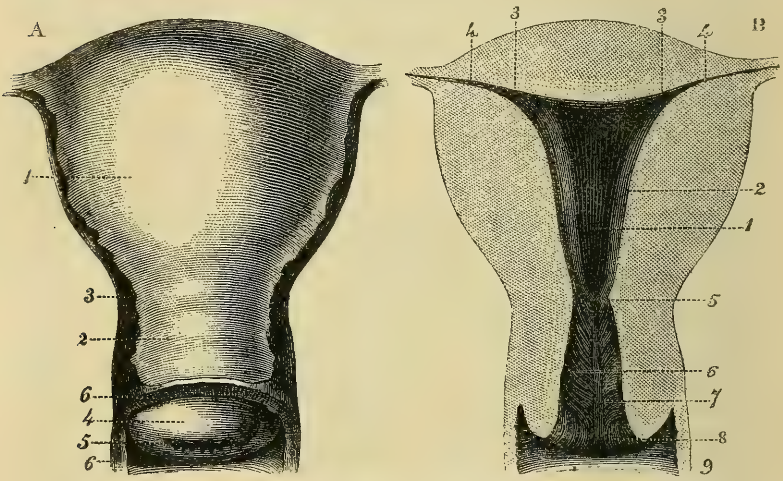

Fig. 18.

MULTIPAROUS UTERUS, ÆT. 26—(AFTER SAPPEY).

A. Anterior aspect. B. Uterine cavity.

A. 1, body of uterus, much larger than that of the neck; 2, the neck; 3, isthmus; 4, os tincæ; 5, os externum, a transverse fissure, its margin notched; 6, 6, vagina.
B. 1, cavity of body; 2, left lateral border; 3, 3, upper border; 4, 4, its upper or lateral infundibuliform angles continuous with the Fallopian tubes; 5, its lower angle forming the os internum; 6, cavity of the neck; 7, arbor vitæ; 8, posterior lip of os externum; 9, vagina.

This contact of the walls of the body of the uterus, together with the mucous plug usually filling the cervix, and the closing of the vagina by approximation of its walls, prevent the intrusion of air into the cavity, and thus obviate the foulness that would otherwise result from decomposition of the secretions.

The cervical cavity is fusiform in some cases, conical in others, according to the extent of the opening of the os externum. Although the columns of the arbor vitæ are so adapted as to dovetail with each other, there is usually a distinct cervical cavity, the walls not being commonly in close apposition.

If we next make a longitudinal section transversely, so as to separate along the entire length the anterior half of the uterus from the posterior, we see the triangular shape of the cavity of the body of the uterus, with its two superior angles drawn out funnel-wise, to be continuous with the Fallopian tubes, and its inferior angle contracting to be continuous at the isthmus with the canal of the cervix (see Figs. 18, 19). Below the isthmus is the cervical cavity, fusiform or conical. In multiparæ, in whom the os externum is a wide fissure, the conical form is more manifest in this section than in the antero-posterior section, from its giving the whole width of the os tincæ; but even in these the base of the cone at the os tincæ is commonly more contracted than the middle part of the canal.

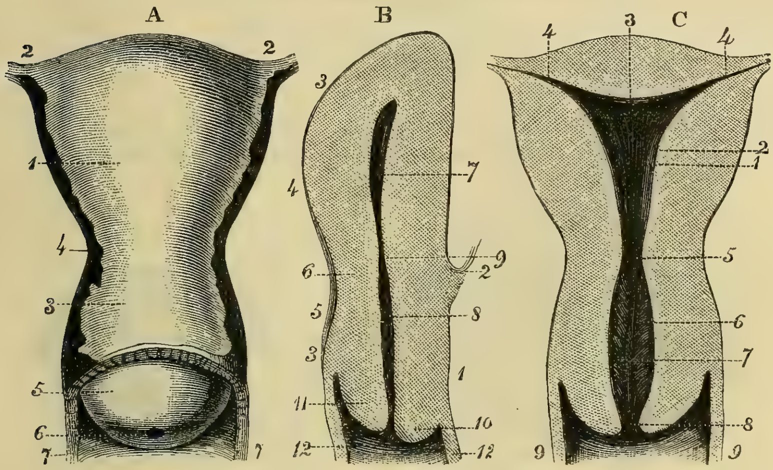

Fig. 19.

VIRGIN UTERUS, ÆT. 22—(AFTER SAPPEY).

A. Anterior aspect. B. Median section. C. Transverse section.

A. 1, body of uterus; 2, 2, its superior angles; 3, neck; 4, isthmus; 5, vaginal portion of neck; 6, os externum, small and circular; 7, vagina.
B. 1, 1, Profile of anterior surface of uterus; 2, vesico-uterine cul-de-sac of peritoneum; 3, 3, profile of posterior surface; 4, body of uterus; 5, neck; 6, isthmus; 7, cavity of body; 8, cavity of neck; 9, its upper extremity; 10, anterior lip of os tincæ; 11, its posterior lip; 12, vagina.
C. 1, cavity of body; 2, its left border; 3, upper border; 4, 4, its lateral infundibuliform angles; 5, its inferior angle; 6, cavity of neck; 7, arbor vitæ of posterior wall; 8, lower end; 9, vagina.

In nulliparæ the os externum is still more contracted, so that the canal approaches the fusiform character. In many cases of sterility, the os externum is a mere round hole no bigger than the os internum, and the central part of the canal is then generally more dilated than usual, so that it is completely fusiform. (See figures of sections under "Dysmenorrhœa.")

A series of horizontal sections, made through the walls of the body, will exhibit a narrow line marking the contact of the anterior wall flattened upon the posterior; made through the isthmus or os uteri internum, a round hole of about the calibre of a No. 8 or 9 catheter, the fibres of the wall disposed in a circular or sphincteric manner around it; and at the margins, right and left, the gaping orifices of the vessels which enter the uterus in greatest size and number at this level; made lower down across the cervical canal, the cavity of this canal is seen somewhat flattened antero-posteriorly (see Figs. 20, 21, 22).

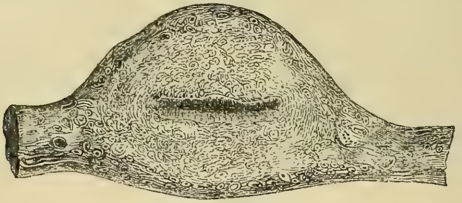

FIG. 20.—AD NAT. (AFTER A. FARRE).
Section made through cavity of the body of the uterus above the entrance of the Fallopian tubes.

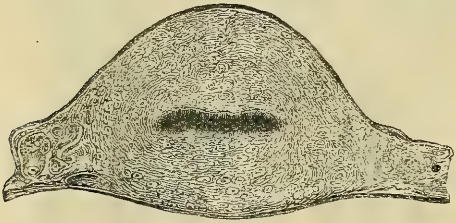

FIG. 21.—(AFTER A. FARRE.)
Section through centre of cavity.

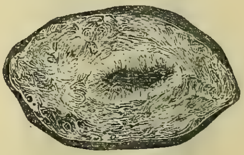

FIG. 22.—(AFTER A. FARRE.)
Through centre of cervical canal.

There is another way of representing the shape and size of the uterine cavities, namely, by taking casts or moulds with wax or plaster of Paris. The information thus acquired has a certain value, but is apt to mislead. Liquid poured into the uterus distends the cavity, and when it has set we get a mould of a cavity such as does not normally exist. But in the case of morbidly dilated cavities, these casts give more accurate representations.

Interior Conformation of the Uterus.—The cavities of the uterus vary in dimension and shape in the virgin and multiparous uterus. In the virgin and nulliparous uterus the entire length of the cavity is on an average 2·10 in., divided in the following manner: Cavity of the body, 0·9 in.; cavity of the neck, 1·00 in.; the intermediate cavity or canal of the isthmus, 0·20 in. In the multiparous uterus the total length rises to 2·30 in., of which the cavity of the body takes 1·10 in; the cervix 0·90 in; the isthmus, 0·20 in. The length of the

CASTS OF CAVITIES OF UTERUS. (After Guyon.)

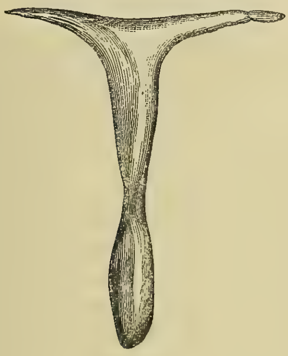

Fig. 23.
1. UTERUS OF VIRGIN, ÆT. 17.

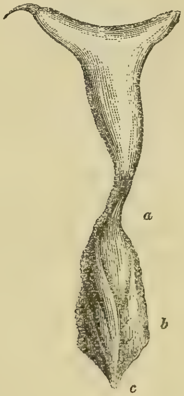

Fig. 24.
2. MULTIPAROUS UTERUS, ÆT. 25—30.
a. Narrowing and lengthening of isthmus.
b. Dilatation of cavity of neck.
c. Narrowing of os externum.

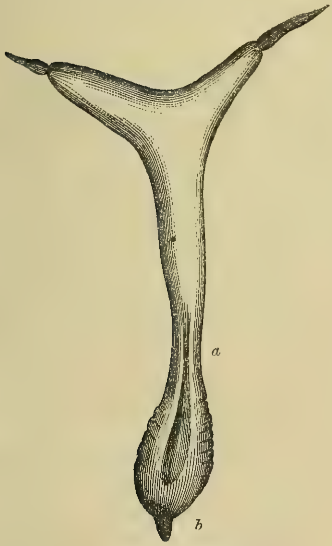

Fig. 25.
3. MULTIPAROUS UTERUS, ÆT. 42.
a. Dilated isthmus.
b. Marked narrowing of os externum.

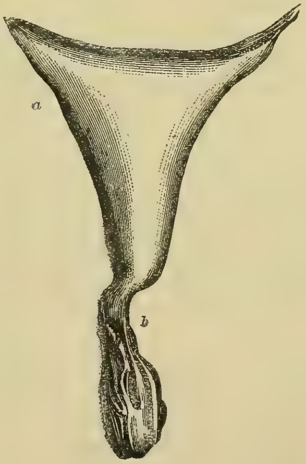

Fig. 26.
4. MULTIPAROUS UTERUS, ÆT. 35.
a. Dilatation of cavity of body.
b. Narrowing and torsion of isthmus.

cavity therefore increases under the influence of pregnancy, and in proportion that it lengthens the vertical diameter of the cavity of the body, at first a little shorter than that of the cavity of the neck, comes to exceed it. In the woman who has borne children, the cavity of the body preserves its triangular shape, but instead of representing a triangle with incurved sides, the sides are rectilinear. Sometimes, however, a degree of curvature persists. The shape and dimensions of the vaginal portion are modified under the influence of repeated gestations. The orifice often becomes large enough to admit the tip of the finger; it is a transverse fissure, measuring from half an inch to an inch, and split at each end. Nor does the vaginal portion commonly project so much into the vagina as in the virgin or multiparous case. It is said that in women who have had many children the os tincæ may disappear completely, so that in its place one finds at the fundus of the vagina nothing but a hemispherical depression, pierced in the centre by a small round hole. In two women who had had, the one seventeen, the other nineteen children, Caseaux found no projection whatever into the fundus of the vagina. My own observations do not bear out this proposition in its absolute sense. In women who have borne as many children as those cited by Caseaux, I have found a fairly prominent vaginal portion if they were examined before the age of fifty. After this age, some women who have had only a few children may, under an exaggerated senile atrophy, exhibit the conditions described by Caseaux.

The capacity of the uterine cavity has been examined by Sappey in the following manner: He closed the os externum, then tied one of the Fallopian tubes, and injected the cavity by means of a lymphatic-injection tube, fitted to the other Fallopian tube. When equilibrium was established between the resistance of the walls and the mercurial pressure, he tied this other tube at its junction with the uterus. Then incising the body, he collected the mercury, and estimated its volume by pouring it into the hollow of a wax mould of one cubic centimetre capacity. The capacity in nulliparæ ranged from two to three centimetres, and in multiparæ from three to five centimetres.

The structure of the uterus must be examined under the opposite conditions of vacuity and of fulness.

A serous investment pertaining to the peritoneum, a proper tissue of muscular nature, an internal or mucous membrane, vessels and nerves, are the constituent parts of the uterus.

A. The *external* or *peritoneal membrane*.—The peritoneum, which has invested the posterior face of the bladder, is reflected over the anterior surface of the uterus, covering, however, the upper three-fourths only, the lower fourth being in immediate relation with the bladder. Thus is formed the utero-vesical, or anterior pouch of the peritoneum.

The peritoneum passes over the fundus of the uterus, clothes the posterior surface throughout, and is prolonged for a short distance down the vagina, below the utero-sacral ligaments, and then is reflected upwards over the rectum. It is the transverse extension of the peritoneum which constitutes the *broad ligament.* In the space which separates the bladder from the uterus, this membrane forms two very small falciform folds, which bear the name of *vesico-uterine ligaments.* Two other folds, much larger, stretching from the posterior aspect of the neck of the uterus to the sides of the sacrum, constitute the *utero-rectal,* or *utero-sacral ligaments.* For a description of the retro-uterine, or Douglas's pouch, see *ante,* p. 23.

The *adhesion* of the peritoneum to the uterus, on a level with the neck and towards the borders, is very loose, but becomes closer the more we approach the median line. It is also more intimate on the posterior than on the anterior aspect. The looseness of the connection of the peritoneum at the level of the neck and borders of the uterus, explains the reason why the peritoneum so rarely shares in even considerable rents of the cervix uteri, and why the effusion of blood in such cases takes place between the tissue of the uterus and the peritoneum.

B. *The proper tissue.*—In the non-pregnant state, this tissue is greyish, very dense, very resisting, and creaks like fibrous tissue under the scalpel. If the consistency of the body of the uterus seems less than that of the neck, this is solely because the first is the more frequently the seat of sanguineous congestion. The proper tissue which constitutes the principal portion of the uterine wall is composed of fibres, that is, of parts disposed in a linear direction. These fibres belong to the muscular tissue of organic life. The contrary opinion was long held. But comparative anatomy, the microscope, examinations during gestation, and physiological observations, have dispelled all doubts upon this point. During pregnancy, and in consequence of the development of tumours, or of an accumulation of liquid in the uterine cavity, the proper tissue assumes all the external characters and properties of muscular tissue, as it is seen in the instruments of organic life.

The *direction* of the muscular fibres of the uterus has been the subject of numerous researches. Malpighi and Monro thought there was nothing regular in the disposition of these fibres; and in the empty state this appears to be the case. They are so interlaced and compressed, that it is in vain we seek to disentangle them. But during gestation, the muscular elements having undergone very considerable development, the mingling of the bundles becomes easier to follow.

It may be admitted that the muscular wall of the uterus is formed of three layers or planes of bundles—an outer, a middle, and an inner. These three layers are not clearly defined, as is the case in the heart. They send communicating bundles to each other. The arrangement of these muscular bundles is by no means constant, but they nevertheless always approach a determinate type.

1st. The *external* or *superficial layer* comprises a longitudinal bundle, or rather a broad median ribbon, and transverse fibres. The median band, the *looped band* of M. Hélie,* arises on the posterior aspect of the uterus, on a level with the union of the body with the neck, by fibres continuous with the transverse fibres. At its origin it is often overlaid by a thin stratum of these transverse fibres. Ascending over the posterior surface of the uterus, it is reinforced successively by similar fibres, which are added to its borders, and by new fibres which spring up in the openings of its primitive fibres. It then curves over the fundus uteri, where its fibres, hitherto parallel, proceed diverging, so that three portions may be distinguished—an inner, an external, and a middle. The inner portion often crosses partially with that of the opposite side of the median line; the external portion runs towards the angles of the uterus, and mixes with the transverse fibres. The fibres of the middle portion descend over the anterior aspect, then successively curve outwardly, to be continued with the fibres forming the round ligaments. Sometimes the innermost fibres of this bundle reach the level of the isthmus of the uterus, and in their turn curve outwardly to mingle with the transverse fibres.

The *transverse fibres* form the principal mass of the external layer. On the lower half of the body they are directly transverse; at a higher level they converge towards the angles of the uterus. Towards the median line, the most superficial fibres sometimes turn up so as to become longitudinal, and to be continuous with the looped bundle. The deeper fibres proceed directly from one side of the uterus to the other. Externally the superficial fibres are prolonged into the broad ligaments, over the oviducts, and into the round and ovarian ligaments; the deeper fibres curve round the borders of the uterus, passing from one aspect to the other. In this course they meet the arteries and veins, which they surround with contractile rings. At the same time the fibres pass from one plane to another, so that those which were at first superficial, become deeper as they get behind.

The *fibres of the neck* are generally transverse, but are a little oblique downwards and inwards, and often crossed on the median line. They send expansions outwardly into the broad ligament, backwards into the utero-sacral ligaments, and sometimes forwards into the utero-vesical ligaments.

2nd. The *middle layer* of the muscular fibres of the uterus forms about one-third of the uterine wall. When sections of this wall are made, it is distinguished by the great size of the vessels, principally veins, which traverse it. It is composed of muscular bundles, which cross each other in all directions, and send off frequent branches, which circumscribe more or less completely large holes or canals in which the blood-vessels are contained. This texture is the same throughout the whole body of the uterus, but is especially manifest in the region which corresponds to the insertion of the placenta. There is nothing like it in the neck.

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* "Recherches sur la disposition des fibres musculaires de l'utérus développé par la grossesse." Paris, 1864.

3rd. The *internal layer* is principally composed of annular fibres from the isthmus as far as the orifices of the Fallopian tubes.

But these fibres are covered on each of the surfaces of the uterus by a broad and thick band of longitudinal fibres, forming a triangular bundle, whose base is superior, and stretches from one tubal orifice to the other; and whose apex, directed downwards, descends nearly to the os internum uteri. It is formed of transverse fibres, which curve from below upwards, run for a certain distance in the longitudinal direction, and then again become transverse. An annular bundle, very powerful, and always a little prominent, surrounds the os internum uteri, forming a true sphincter, which explains the habitual constriction of this orifice. Muscular rings surround the infundibula of the uterine cavity. On the median line of the anterior wall, and on the median line of the posterior wall, the rings of the right and left sides meet, and even interlace. Their upper halves constitute antero-posterior arcs, which form the roof of the uterine cavity. By their inferior halves they begin the series of the transverse annular fibres.

In the neck, on the middle of each wall, a branched muscular bundle gives rise to the projections of the arbor vitæ; it rises from the middle of each wall, and forms arches right and left. Beneath this bundle, but rather deeply, the fibres are transverse or annular, and are confounded with those of the external layer.

C. *The internal* or *mucous membrane*.—Some anatomists, and in particular Morgagni and Chaussier, who observed the inner surface after delivery, have denied the existence of the uterine mucous membrane. But the microscope has set at rest all disputes upon this point. The mucous membrane, however, presents different characters in the cavity of the body and in that of the neck.

The lining membrane of the body of the uterus undergoes a cycle of changes recurring at every menstrual period. It is therefore necessary to trace these changes in the order of succession. Tyler Smith stated clearly, that after the menstrual flow the inner surface of the body of the uterus was left bare, a sharp line of demarcation being observed at the os uteri internum. This I have had opportunities of verifying. John Williams has carefully described the changes through a fairly complete series of specimens. Fig. 27 represents the bare condition just after the shedding of the membrane under menstruation. Fig. 28 represents the uterus three days after menstruation, when the mucous membrane is in course of reformation. Fig. 29 represents the condition from a week after menstruation, when the membrane is still further developed.

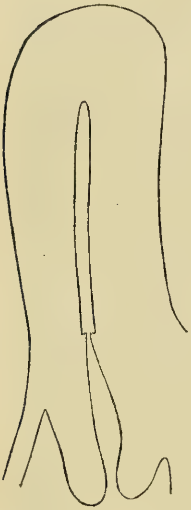

Fig. 27.
Menstruation just ended. Mucous membrane quite shed.

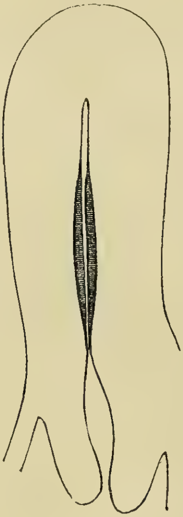

Fig. 28.
Three days after menstruation. Mucous membrane regenerated.

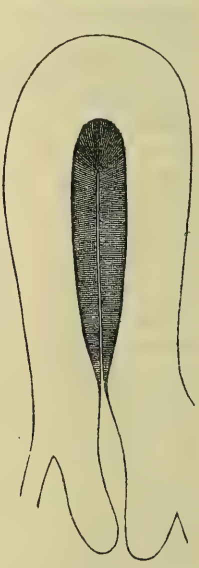

Fig. 29.
Just before menstruation. Mucous membrane at maximum development.

(After John Williams.)

The mucous membrane of the uterus proper, says Kundrat,* is distinguished by its peculiar connective-tissue basement-layer rich in cells, and by the absence of a sub-mucous tissue. The tubular glands are also characteristic. These Kundrat and others describe as running more or less perpendicular to the free surface. Williams finds them more often variously oblique. They form culs-de-sac at their commencement, where they often divide, and dip in between the muscular fibres of the uterine wall. The narrowest portion of their canals is at the outlet on the free surface, where the openings are seen as little pits by the naked eye or magnifying glass. They are round or oval on cross-section. They are lined by columnar cells with cilia. The connective-tissue of the mucous membrane spreads outwards into the muscular tissue, thus uniting the two. This description applies to the uterus from the time of its full development until the stage of climacteric atrophy.

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* Stricker's "Jahrbücher," 1873.

The glands are imperfectly formed at four years old. They then form small depressions in groups. At ten these depressions have lengthened out into tubes, but still they rarely reach the muscular wall. At twelve or thirteen the deep portions of the tubes are often divided and curled. At the climacteric the connective-tissue becomes thicker, more fibrous, the cells smaller, the glands narrower, and in part disappear, or are changed into little cysts.

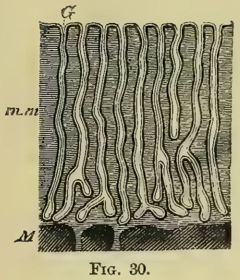

FIG. 30.

SECTION THROUGH MUCOUS MEMBRANE OF NORMAL VIRGIN UTERUS × 40—(AFTER KUNDRAT).

m.m, mucous membrane; G, glands; M, muscular coat, of which inner layer is shown.

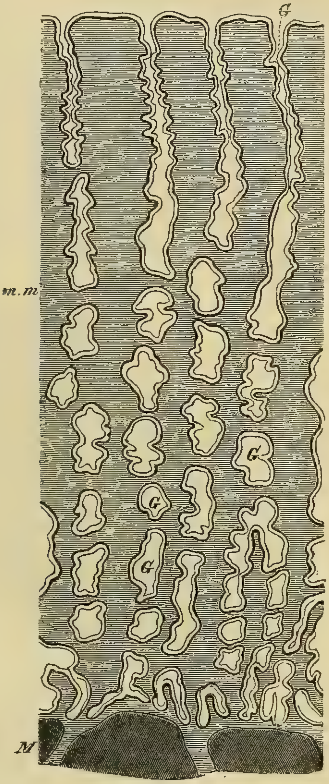

FIG. 31.

SECTION OF A MAIDEN MENSTRUATING UTERUS × 40—(AFTER KUNDRAT).

References as in Fig. 30.

The difference, especially of size, of the mucous membrane during menstruation and in the intervals may be appreciated by contrasting Figs. 30, 31, from Kundrat.

The Neck of the Uterus—Here the mucous membrane is much thicker than in the body; it is whiter, denser, and less friable. It is 0·04 inch thick; but this thickness is much increased at the level of the folds of the anterior and posterior walls. The mucous membrane of the neck is furnished in its lower third or half with warty or filiform papillæ, 0·08 inch to 0·25 inch high, and which are very numerous on the external surface of the os tincæ. Formed of an amorphous substance, including a multitude of nuclei, they make no projection on the surface of the epithelium. They are, however, well seen when the epithelium is removed by maceration, as in Fig. 32, a preparation made by Dr. Hassall. Between these folds are seen a multitude of round or oval orifices from 0·12 inch to 0·16 inch wide, arranged in linear series and leading to the irregular cavities lined with cylindrical epithelium. The diameter of these cavities, which occupy the whole thickness of the mucous membrane, is scarcely larger than that of their openings.

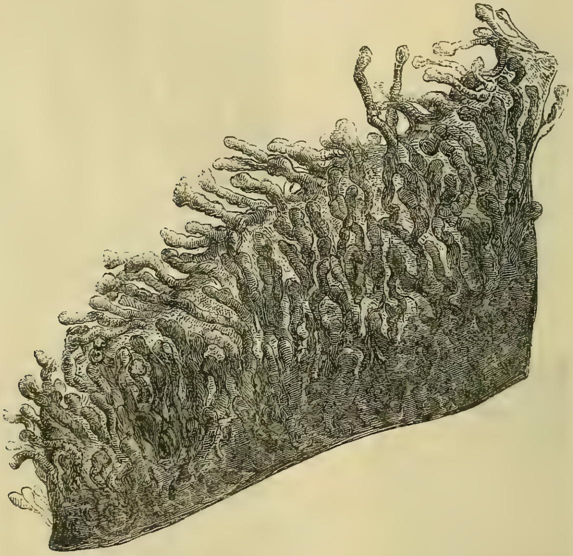

Fig. 32.

VILLI OF THE OS UTERI, FROM WHICH THE EPITHELIUM HAS BEEN REMOVED—(AFTER TYLER SMITH AND HASSALL).

According to Sappey the glands of the cervix are branched, not simple tubes or follicles. They are prolonged as far as the muscular tunic, and are far more complicated than is generally supposed. Each is formed of a duct which divides into two or more branches, which again subdivide, and terminate in a cul-de-sac. Their orifices open on the mucous membrane of the neck at the bottoms of the furrows of the arbor vitæ. They secrete the clear viscid mucus which is usually found filling the uterine neck; and which in the state of catarrh escapes abundantly.

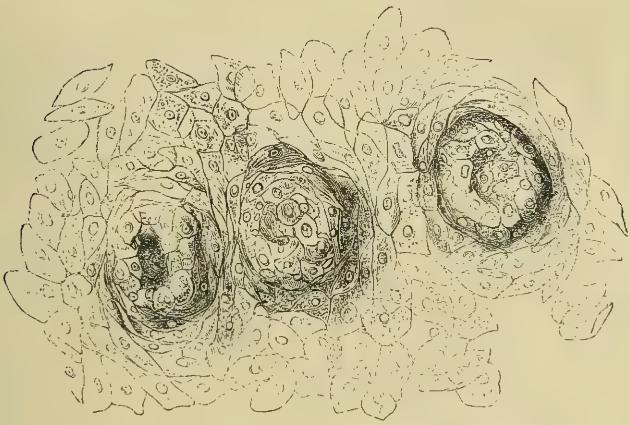

FIG. 33.
EXTREMITIES OF VILLI OF OS UTERI, COVERED BY SQUAMOUS EPITHELIUM, SHOWING THEIR CENTRAL DEPRESSIONS—(AFTER TYLER SMITH AND HASSALL).

The mucous membrane of the neck is composed of a mucous chorion formed almost exclusively of connective tissue, and of an epithelium formed of cylindrical cells in the upper two-thirds of the neck, and of pavement cells in the lower third.

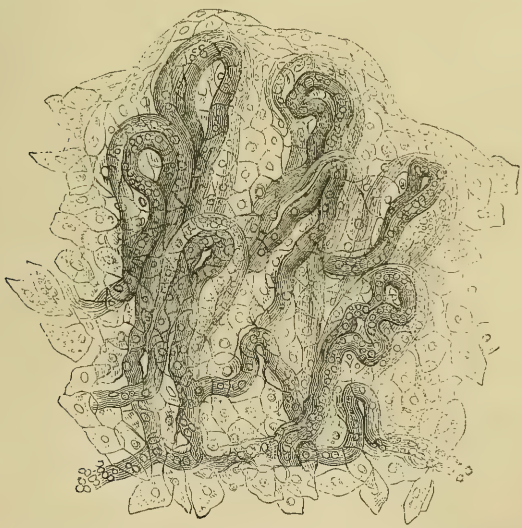

FIG. 34.
VILLI OF OS UTERI, COVERED BY PAVEMENT EPITHELIUM AND CONTAINING LOOPED BLOOD-VESSELS (AFTER TYLER SMITH AND HASSALL).

We often meet, on the surface of the mucous membrane of the os uteri externum, with spherical translucent vesicles called *ovula Nabothi.* These are obstructed muciparous follicles which are found in the cavity of the body as well as in that of the neck, but which especially abound in the neighbourhood of the os uteri. When small they remain buried in the mucous membrane. They only become visible when the mucus accumulates in their cavities through the obliteration of their orifices. When very largely developed they have given rise to the suspicion of serious disease. They are formed of an investing membrane of connective tissue, and of cylindrical epithelium; and contain a transparent, vitreous, or colloid liquid.

Vessels and Nerves.—1st. *Arteries.* The arteries of the uterus spring from two sources: (*a.*) Some arise from the hypogastric, and take the name of uterine arteries. Placed at first on the sides of the vagina, they penetrate the broad ligaments in the neighbourhood of the cervix uteri, ascend along the borders of the uterus, and anastomose with the utero-ovarian arteries. (*b.*) The others, not less considerable, spring from the ovarian arteries, called for this reason by Cruveilhier, utero-ovarian; they reach the upper angles of the uterus, then descend along the borders of this organ, to anastomose with the uterine arteries.

The branches furnished by the two arteries which, on either side, run along the border of the uterus, course at first under the peritoneum, surrounded by the muscular bundles which proceed from the uterus; then, after a certain course, they plunge into the substance of the muscular tissue, where they ramify and anastomose with each other, and with the branches of the opposite side. All these branches, which are very numerous, are remarkable for their cork-screw twistings. It was thought at one time that this helicine disposition was designed to favour the development of the pregnant uterus by uncurling, and becoming straight as the uterus grew; but the fact is, that the arteries, even in advanced pregnancy, are as flexuous as in the non-pregnant state. These arteries are not distributed equally to all parts of the uterus; the neck receives but a small number; at the neighbourhood of the upper angle of the uterus, on the other hand, the utero-ovarian artery supplies suddenly from twelve to eighteen tufts of arteries, spirally curled, which cover with their ramification the whole of this region. At the level of the furrow, which separates the body from the neck, M. Huguier has described an arterial circle formed by the anastomoses of the arteries of the right side with those of the left. The ultimate ramifications of the arteries of the uterus are distributed in the mucous membrane. The ramuscules in this membrane are of importance as to size only in the deeper layers; beneath the epithelium they form a capillary net-work, very fine and close, the interspaces of which receive the orifices of the glands. The coats of the arteries are, as Mr. Rainey pointed out, very thick, and are apt, unless care be observed, to be mistaken for the proper fibre of the uterus.

2nd. *The veins* of the uterus are remarkable for their enormous development; they are large canals hollowed out of the thickness of the muscular substance, and frequently communicating with each other. They have been called the *uterine sinuses,* and M. Rouget has described them under the name of the *corpus spongiosum* of the uterus. The uterine sinuses occupy all the body of the uterus, and cease abruptly at the level of the os uteri internum. The neck itself has a much less marked venous development. Between the uterine sinuses, we find in the wall of the uterus venous ducts twisted spirally, like the arteries, and which are analogous to the *corpus spongiosum* of the male urethra. On the lateral borders of the uterus these sinuses communicate with vast *venous plexuses,* situated in the thickness of the broad ligaments, and continuous below with the vaginal plexus, and above with the sub-ovarian plexus. They have received the name of the *pampiniform plexuses.* From these plexuses proceed below, the pudic veins; in the middle, the uterine veins; above, the ovarian veins. These last present but very few valves, and assume full development only after puberty.

3rd. The *lymphatic vessels,* during pregnancy and after delivery, are, like the veins, of considerable size. They form several planes in the thickness of the uterus; the superficial are the largest. They are divided into two groups; those of the neck, which run to the pelvic ganglia; those of the body, which terminate in the lumbar ganglia. These last accompany the utero-ovarian veins. Dr. Lucas-Championnière* describes a ganglion situated above the lateral vaginal cul-de-sac, closely applied at the union of the body and neck. When this ganglion is missing, its place is taken by close networks of lymphatics. Gallard thinks this ganglion or network plays an important part in pathology, as the starting-point of puerperal and other affections.

4th. The *nerves* proceed, some from the renal plexuses and inferior mesenteric, to reach the uterus, being closely bound to the utero-ovarian arteries; others, proceeding from the hypogastric plexus, are formed by some anterior branches of the sacral nerves, and by branches proceeding from the lumbar ganglia of the great sympathetic. These two plexuses anastomose in the thickness of the broad ligaments, and send off filaments over the two surfaces of the uterus which penetrate into the substance of the organ, keeping in intimate contact with the arteries, or coursing in the spaces between the arteries.

The following account by M. Boulard is adopted by Cruveilhier:

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* "Lymphatiques utérins et lymphangite utérine." Bull. de la Soc. Méd. des hôpitaux de Paris, vol. vii.

1. The nerves of the uterus are very few in number.

2. They do not increase in size during pregnancy. The principal differences, observed during pregnancy and in the non-pregnant condition, bear more upon the state of the plexuses than on the volume of the nerves.

3. In the child, the elements of these plexuses, crowded together, seem to constitute a true nervous membrane; from these there proceed very delicate nerves, which run to the uterus and broad ligaments to give off their filaments, which are entirely capillary.

4. In woman whose uterus is developed, the plexus is carried higher up; its elements are separated, and form more or less considerable spaces; and as to the nerves issuing from it, they only differ in being longer, coinciding with greater tenuity if compared with those met with in the normal uterus of an adult woman.

5. These nerves issue from the hypogastric ganglion and plexus, as well as from the nervous ring or ganglion which surrounds the urethra at its entry into the bladder. They reach the sides of the uterus, and thence follow in part the distribution of the arteries. In every case they are accompanied by a very fine arteriole. Some, very fine, reach the anterior and posterior surfaces, as well as the fundus of the uterus.

6. As to the neck, imitating the prudent reserve of Longet, Boulard does not absolutely decide the question on account of the extreme difficulty of the dissection. He, however, believes that the uterine neck, that is the vaginal portion, is not completely deprived of nerves. He thinks he has traced a nervous filament ramifying in the anterior lip of the os tincæ. Sappey finds nerves in the neck.

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7. M. Boulard has never seen uterine plexuses or ganglia. It is enough, he says, to cast the eye upon the walls of a developed uterus, after having removed the peritoneum, to recognise how easy it is to fall into error, and how easy to represent as nerves and ganglia, muscular fibres, venulæ, lymphatic vessels, &c., especially after a prolonged submersion. The supra-vaginal portion is freely supplied, but the infra-vaginal portion is very scantily supplied with nerves. Hence excision, division, cautery, may cause little pain unless inflammation be present. The pain sometimes evoked on touch is often due to communicated pressure in parts beyond. In cancer there is little pain, so long as the disease is limited to the vaginal portion.

THE VAGINA.

The vagina is a musculo-membranous canal extending from the vulva to the uterus. It is at the same time the organ of copulation in woman, and the canal serving for the passage of the menstrual blood on the one hand, and of the product of conception on the other.

It is situated in the cavity of the pelvis, between the bladder and the rectum. Maintained in its position by intimate adhesions with the surrounding parts, the vagina is still not so fixed but that it may undergo an inversion upon itself like the finger of a glove or an invagination. This, in fact, is the true nature of most of the cases of so-called prolapsus with procidentia of the uterus. It is to be observed that the anterior wall of the vagina is shorter than the posterior wall; the difference being from 0·4 inch to 0·8 inch. Its direction is oblique from above downwards, and from before backwards. When the bladder is empty, its axis forms with that of the uterus a right angle. When the bladder is full, the angle of junction is obtuse, the open aspect of the angle looking upwards and forwards.

The vagina is not of equal width in all parts of its length. Its lower or vulvar orifice is the narrowest part; its upper extremity has much larger dimensions. In women who have had children, the fundus of the vagina forms a large bag, in which the speculum may be made to sweep freely, and in which also a large quantity of blood may accumulate in cases of uterine hæmorrhage. Moreover, this canal is eminently dilatable, as is proved by parturition; it is at the same time elastic; and after labour it may return nearly to its original dimensions. The part which is most dilatable and the least elastic is certainly the upper part, to which the name of *vaginal bag* might well be given, whilst the lower orifice might be called the *vaginal strait.*

When not dilated by a foreign body, the walls of the vagina touch each other at every part, so that its cavity is completely closed. This may be clearly demonstrated by watching the behaviour of the vagina during the withdrawal of the tubular or bivalve speculum. As the instrument retreats from the fundus, the walls of the vagina close up behind it, and even help to expel the speculum by its elasticity and contractile action. There are, however, cases in which the fundus of the vagina presents a true cavity, the walls not being in contact. This I have chiefly seen in women who were subject to prolapsus. It is also often remarkable during the process of abortion. If a horizontal section of the organ is made, it exhibits a transverse slit not always of exactly similar shape. Generally this slit is slightly curvilinear, with anterior convexity, and each of the two extremities falls upon an antero-posterior slit, which gives to the whole the form of the letter H. This form is perfectly adapted to that of the neighbouring parts; for the urethra is placed in the opening of the anterior branches, and the rectum is received into the posterior space. The transverse branch is generally about 0·25 inch long in the adult. In the child it is shorter, and the section takes rather the shape of a star. The calibre of the vagina is smaller in virgins. It is comparatively inextensile. Its muscular power seems greater than in married women, and especially than in those who have borne children. Hence the care that is necessary in the selection and use of instruments, as the speculum and pessaries, in single women. Still the walls of the vagina are generally easily extensible; but they would not be extensile enough to permit the child's head to pass in labour, if the vagina did not share during pregnancy in the hypertrophy of the uterus; and if in hypertrophying it did not dilate sufficiently to prepare it for this function of an excretory canal.

Relations.—1. The anterior aspect of the vagina, which presents a slight concavity in the transverse direction, answers above to the base of the bladder. To this organ the vagina is united by a dense filamentous cellular tissue. Lower down the vagina is united to the urethra, and the relation is so intimate that the urethra seems to be hollowed out of the anterior wall of the vagina. The urethra may thus be felt like a prominent cord running along the median line. It thus forms an excellent guide to the situation of the meatus, serving as a direct clue in passing the catheter. This intimate adhesion of the vagina with the bladder and urethra explains why these latter organs are constantly dragged down in displacements of the uterus.

2. The *posterior aspect* of the vagina answers to the rectum, through the peritoneum in its upper third or quarter, and immediately in its two lower thirds or three quarters. But I have shown that the peritoneum comes down lower on the left side of the vagina, than it does in the median line behind. This disposition of the peritoneum explains why, when the posterior wall of the vagina is torn in its upper third or fourth, the intestines may fall through the rent. The vagina adheres to the rectum by a cellular tissue much looser than that between the bladder and vagina, so that the rectum is not so liable to be dragged down in the displacement of the vagina.

The *recto-vaginal septum* is the septum formed by the apposition of the posterior wall of the vagina and of the anterior wall of the rectum. Inferiorly the rectum detaching itself from the vagina, there is formed a triangular space, whose base is below, and whose antero-posterior diameter defines the thickness of the perineum (see Fig. 1).

3. The lateral borders of the vagina give attachment above to the broad ligaments; below to the pelvic aponeurosis. They are crossed by the levatores ani muscles, which, however, take no insertion here.

The *inner surface*, or mucous membrane of the vagina, is smooth in its upper portion, and presents on its two walls flattened rounded tubercles, measuring from 0·04 inch to 0·12 inch in diameter, and pressed against each other; or else there are crests or transverse imbricated prominences representing very nearly the irregular asperities of the roof of the palate. These different prominences all spring from a median crest, which stretches under the form of a raphe along the walls of the vagina. The two median raphes are called the *columns of the vagina.* They present wide dissimilarities in individuals in form and size, and appear to be a vestige of the vice of conformation which consists in a median vaginal septum—a vice which although coinciding most frequently with bifidity of the uterus, may exist independently. The *anterior column* sometimes begins immediately behind the meatus urinarius, sometimes at a little distance from this orifice under the form of a large tubercle which serves as a guide in introducing the catheter. Greatly developed and very prominent at this point, it gradually diminishes, and is insensibly lost in the upper third of the vagina. The anterior column is often divided by a median groove, more or less deep, into two lateral portions.

The *posterior column* is generally less prominent than the anterior.

The columns of the vagina are formed of a kind of cavernous or spongy tissue. The venous plexuses situated around the vagina send numerous prolongations into the thickness of the muscular tunic, and even into the mucous tunic; around these the bundles of muscular fibres interlace in all directions, representing the trabeculæ of erectile tissues.

The rugæ of the vagina, very numerous in the new-born child and in virgins, are partly obliterated after delivery in the upper part of the vagina; but they always persist in the lower part, and especially at the vulvar orifice and in front. These rugosities are not folds, and cannot serve in facilitating the distention of the vagina.

The inferior or vulvar orifice presents in front an extremely rugous transverse prominence. This prominence, which is seen as soon as we separate the labia majora and minora, narrows, and even seems to close the entrance of the vagina. It belongs to the anterior column.

The *vulvar orifice* is not situated in the centre of the inferior strait of the pelvis; it approaches the pubic arch, and is separated from the coccyx by a much more considerable space. Even after labour, and throughout life, the vulvar orifice remains narrower than the rest of the vaginal canal. Hence a well-designed speculum should pass the vulva easily, and admit of expanding at the fundus of the vagina. It is only when the perineum has been extensively torn, or after long dilatation in complete procidentia with eversion of the vagina, that the vulvo-vaginal orifice loses its proper character.

In virgins the orifice is provided with a membrane, the existence of which is constant in the normal state, but whose form is subject to numerous variations. This is the *hymen* (from ὑμὴν, a pellicle); it is a kind of diaphragm interposed between the internal genital parts on the one side, and the external parts and the orifice of the urethra on the other.

The situation of the hymen does not seem to be constant. I have sometimes found it, or an equivalent fold or valve of mucous membrane higher up than usual, that is, quite *half way* between the vulva and the roof of the vagina.

This membrane is usually crescentic with the concavity anterior: it occupies the posterior half of the circumference of the vulvar orifice, and its extremities come forward to lose themselves on the sides of the meatus urinarius. Sometimes it forms two-thirds of a circle, or even a complete circle, perforated near the anterior part of its circumference. The adherent border of the hymen is its thickest portion. Its free border is thin, concave, often irregular, notched in shreds or fringes, which lap over the meatus. Not seldom the hymen forms a membrane which completely closes the inferior orifice of the vagina, constituting the vice of conformation known as imperforate vagina. It usually is large enough to admit the forefinger with some little difficulty. If examination is made under anæsthesia, the membrane more easily stretches; but otherwise it is readily torn, and bleeds. But it may be very resisting, fibrous, or even cartilaginous, and render copulation impossible. It may also happen that the hymen is very loose, or is provided with a large opening; it has been simply pushed back by the penis without being torn, and has been preserved intact until the moment of labour. It has even been known to persist in prostitutes. When the hymen has been torn, the bleeding shreds are retracted and cicatrize: they shrink, and give rise to the tubercles called *carunculæ myrtiformes.* The number, form, and situation of these carunculæ vary extremely. Most frequently they are three, thick and fleshy, and occupy—one, the posterior part, the other two the sides of the entrance of the vagina. Sometimes, instead of tubercles, lengthened shreds are found, or slight eminences with hooked borders, like a cock's-comb, or small pediculated polypi. The laceration of the hymen may be partial; then it persists as a complete half-circle, narrow, with notched edges, or with fissures extending to the base.

The hymen is constituted by a mucous fold, containing between its lamellæ a layer of cellular tissue, enclosing numerous elastic fibres, and some muscular bundles of organic life. Some blood-vessels ramify in its thickness. Pavement epithelium covers its two surfaces.

Structure of the Vagina.—Thin above, the vagina thickens considerably at the level of the urethra, and terminates by a rugous, and very prominent enlargement, forming the protuberance at the entrance of the vagina, already described. The vagina invested behind, for a short space, by the peritoneum, has membranous walls not at all resembling those of the uterus. They are composed essentially of an *internal or mucous coat,* and of an external or muscular coat, which it is impossible to isolate by the scalpel, but which, on section, may be distinguished by their colour. The first is white, the second reddish. Their thickness increases as we approach the vulvo-vaginal orifice. Around these two tunics is stretched a thin layer of cellulo-fibrous tissue, in which are found numerous *elastic fibres.*

The *muscular tunic of the vagina* is composed of bundles anastomosing and crossing so as to form nets in the large openings filled up with connective tissue. Sometimes the connective tissue, sometimes the muscular predominates.

The disposition of the muscular bundles presents nothing regular. The longitudinal and the circular fibres do not form distinct layers. The first, however, predominate near the mucous membrane, the latter near the external surface of the vagina. According to M. Rouget, the longitudinal or oblique fibres cross from side to side of the vagina; one part are continuous above with the external longitudinal fibres of the uterus; the other part more numerous, run downwards and backwards on the sides of the rectum, and pass between the large vessels, united here into plexuses.

The *vaginal mucous membrane* is formed of a very dense connective tissue, abounding in elastic fibres. This it is which explains its great strength and the enormous distention it can undergo in the act of labour, without bursting. Numerous vascular papillæ, conical or filiform, cover the surface of the membrane; but they are buried and hidden in the investing stratified pavement epithelium. They are met with also in the interval of the prominences of the vaginal mucous membrane. They are absent only in the neighbourhood of the uterine neck.

There are no glandules in the vaginal mucous membrane. According to Henle there are found exceptionally follicles analogous to the solitary follicles of the intestine, especially in the upper portion, and on the uterine neck. Huschke says, it is rich in muciparous glands. Sappey, on the other hand, affirms that after long and patient researches he has found nothing of the kind. Certainly if we may reason from the character of the discharges given off from the surface, I should agree with Sappey. These discharges are not mucous, but epithelium scales.

The *Bulb of the Vagina.*—Besides the rugous tubercle found in front of the orifice of the vagina there exists around this orifice a swelling or large cavernous body, filling the space which separates the entrance of the vagina from the roots of the clitoris. This is the bulb of the vagina. Not very thick in front where it is placed between the meatus urinarius and the clitoris, it swells progressively from this middle portion, and ends below on the sides of the vagina by a rounded extremity. The posterior part of the vaginal orifice only is deprived of bulb. It would be more exact, perhaps, to admit two bulbs, one on either side. These two bulbs have been compared by Kobelt to two gorged leeches. The dimensions of the injected bulb according to Kobelt are: length, 1·50 in.; width, 0·50 in. to 0·80 in.; thickness, 0·36 in. to 0·50 in. But these vary extremely according to age, frequency of sexual relations, of labours, and, lastly, to individual peculiarities. The external surface of the bulb is convex, and covered by the constrictor muscle of the vagina; it answers to the ischio-pubic ramus. Its internal surface is concave, and is applied around the vaginal orifice. The two halves of the bulb are united anteriorly, from which part issue numerous veins, establishing a communication between the bulb and the gland and corpora cavernosa of the clitoris. These veins receive also those which proceed from the frænum and labia minora in front, and from the labia majora behind. Some run directly to the dorsal vein.

Behind, the bulb furnishes not less numerous veins which communicate with those of the vestibule, vulva, urethra, and the venous networks situated around the bladder. From the terminal enlargement of the bulb also, large venous trunks, the true efferent vessels of the bulb, run to the internal pudic vein and communicate with the external hæmorrhoidal veins.

The bulb of the vagina represents the corpus spongiosum in the urethra of man. It is composed of an investing membrane, very thin, and of an areolar spongy tissue, the spaces of which, rather large, are bounded by trabeculæ formed of connective tissue and smooth muscular fibres. The bulb receives from the internal pudic artery a considerable branch, which penetrates at the posterior enlargement. This branch supports some very delicate nervous filaments which are distributed with it in the bulb.

Vessels and Nerves of the Vagina.—The principal arteries, the *vaginal*, proceed from the hypogastric. The uterine, vesical, and internal pudic all give branches to the vagina as well. All these branches ramify in the substance of the muscular tissue, to which they supply numerous ramuscles, and terminate in the substance of the mucous membrane.

The *veins* arise from the capillary network of the mucous membrane, reach the borders of the vagina, and empty themselves into the rich plexuses which surround it. These veins communicate below with those of the bulb, above with those of the uterus.

The *lymphatic vessels*, easily injected through the lymphatic network of the mucous membrane, proceed to the lymphatic ganglia of the pelvis.

The *nerves* come from the hypogastric plexus.

Development of the Vagina.—The origin of the vagina has been already considered at the same time as that of the uterus. According to Meckel, the rugæ and rugosities of the vagina only become manifest towards the fifth month of intra-uterine life. The hymen only appears towards the middle of fœtal life. It is directed from behind forwards, is rough, thick, and more distinctly notched than at a later period. Its existence in the fœtus is constant.

THE VULVA.

Under the name of *vulva* is comprised the collection of external genital parts—that is, the mons Veneris, the labia majora and minora, the clitoris, the meatus urinarius, to which might be added the orifice of the vagina.

1. The *mons Veneris.*—This is the name given to a rounded eminence, situated in front of the pubes above the vulva. This eminence is due in part to the projection of the bones, and partly to the adipose tissue which forms a cushion under the skin. At the epoch of puberty it is covered with hair.

2. The *labia majora.*—These are two prominent folds of skin which bound an antero-posterior opening to which most anatomists have given the name of vulva. Flattened transversely, thicker in front than behind, they present an external aspect covered with hair, and an internal aspect moist and smooth, contiguous with the same aspect of the opposite labium. It has also a free border, convex, and covered with hairs; an anterior extremity continuous with the mons Veneris; a posterior extremity which is united to that of the opposite side to form a commissure—the *fourchette,* which is often torn during labour. The space between the *fourchette* and the anus constitutes the *perineum,* which is an inch or more long in the majority of subjects. The space which separates the fourchette from the extrance of the vagina is called the *fossa navicularis.* The labia are composed of a layer of skin and a layer of mucous membrane, both richly supplied with sebaceous glands. The glands of the cutaneous surface open into the hair-follicles, those of the mucous aspect open, generally, directly on the mucous membrane. Enclosed between the skin and mucous membrane is a large quantity of adipose cellular tissue in subjects at all fat; in all, applied closely to the mucous aspect is a considerable layer of a fibroid tissue, whose fibres directed longitudinally, are chiefly elastic, but in which are also seen some longitudinal bundles of smooth muscular fibres. The adipose tissue is situated beneath the cutaneous aspect. Arteries, veins, lymphatics and nerves make up the constituent structures.

The labia majora present great analogy to the male scrotum. Embryology establishes this analogy conclusively. M. Broca has even described a membranous sac which in its structure, arrangement, and relations, exactly represents the dartos in man.*

In the fœtus, the peritoneal prolongation which accompanies the round ligament, which is called the *canal of Nuck,* terminates in a cul-de-sac in the mouth of the dartoid sac.

3. The *labia minora* or *nymphæ.*—These organs come into view on separating the labia majora. They are two mucous folds, narrow behind where they arise on the internal aspect of the labia majora, widening as they advance forwards and converging. Having reached the level of the clitoris they become a little narrower, and bifurcate before terminating. The inferior branch of the bifurcation is attached to the posterior border of the clitoris, with which it is continued, and thus forms the frænum. The upper branch, uniting to that of the opposite side, forms a hood-like fold, which is the prepuce of the clitoris. The surfaces of the nymphæ are smooth or slightly roughened; their free border is convex, nearly acute, and often slightly notched. The dimensions vary greatly according to age and race. In the new-born child, the nymphæ project beyond the labia majora. In the Hottentot woman they attain an enormous length, and constitute what is called the apron. The mucous membrane is covered, like that of the rest of the vulva, with a stratified pavement epithelium, or rather with a true epidermis. The derma is provided with simple papillæ, mostly vascular and conical. Their substance consists of a non-adipose tissue, and large bundles of elastic fibres anastomosing in network. Sebaceous glands, analogous to those of the internal aspect of the labia majora, but smaller, open on both surfaces, but principally on the internal surface, where they form a very crowded layer.

The vascular network of the mucous membrane is extremely developed; it is fed by branches of the internal pudic artery. The veins springing from these vessels are very numerous, and form a plexus seated in the thickness of the cellular tissue interposed between the two laminæ of the nymphæ, giving to these a sort of erectile character.

4. The *clitoris* is an erectile organ representing with tolerable exactness the corpora cavernosa of the penis. Its free extremity appears at the anterior part of the vulva about ½-inch behind the anterior extremities of the labia majora, under the form of a median tubercle, which is capped by the prepuce of the nymphæ, and which is continuous with the inferior branches of the bifurcation of these organs. This tubercle, compared with the glans penis, is the *gland of the clitoris;* it is imperforate, and

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* "Bulletin de la Société Anatomique," 1851.

is generally but little developed. When excessively developed it may assume an appearance not unlike the penis in size and form, and such cases have been reported as instances of hermaphroditism. Like the corpora cavernosa of man the clitoris arises from the ischio-pubic rami by two roots, which enlarge as they converge at the level of the symphysis. Here they unite to form one body. The clitoris has a suspensory ligament, and an ischio-cavernous muscle, resembling those of the penis. The corpora cavernosa consist also of a fibrous investment, a median septum separating the right from the left corpus, and a cavernous tissue formed of fine trabeculæ in which the muscular element is very abundant.

The *arteries* of the clitoris are the cavernous and the dorsal. The latter belongs almost exclusively to the gland. The veins are very numerous; some emerge from the gland, and form the anterior radicles of the dorsal vein; others arise from the concavity of the corpora cavernosa and establish communications between the gland and the corpora cavernosa on the one hand, and the bulb of the vagina on the other; others, again, arise from the roots of the clitoris and proceed to the pubio-vesical plexus.

The *nerves* come from the internal pudic; they are principally distributed to the gland, in which they form thick plexuses.

5. The *meatus urinarius.*—Just behind the clitoris, in the median line, and immediately in front of the protuberance at the orifice of the vagina, is the orifice of the urethra. It usually exists as a longitudinal or starred slit, the borders of which are slightly notched and projecting.

The *mucous membrane* of the vulva is continuous on the one hand with the skin of the labia majora, and on the other with the mucous membrane of the vagina. It is composed of a very thin mucous chorion formed of bundles of connective tissue and very fine elastic fibres, and it is covered by a layer of cells rather to be classed amongst the epidermic than the stratified epithelia, since its superficial layers are distinguished by their flattened laminous form and their want of nucleus. Vascular papillæ, usually simple and conical, abound on the mucous skin. At the level of the labia minora and of the clitoris numerous nervous fibres are distributed. On the labia majora and minora *sebaceous follicles* are thickly seated; they are visible to the naked eye, and supply a caseiform odorous matter. The same follicles abound around the meatus urinarius and the vestibule, that is to say, that part situated between the clitoris and the meatus. Some of them open on the sides of the vagina; but the most remarkable orifice is that which corresponds to the vulvar gland.

The *vulvar* or *Bartholini's gland*, was described by Bartholini, Cowper, and Duverney; hence it also bears the name of the latter anatomists. More recently it has been studied by M. Huguier, who has named it the *vulvo-vaginal gland.* It is situated on either side of, and in the posterior part of the vaginal opening. It is ovoid, rounded, reniform, or flattened. In size it is about that of an almond; but in this respect it varies, and even on the two sides. Sometimes also glandular lobules, seemingly detached from the gland and scattered amongst the surrounding muscle, are found. The vulvar gland is in relation inwardly with the vagina, to which it adheres by a dense cellular tissue; outwardly, with the constrictor muscle of the vagina. It has an excretory duct about ½-inch long, directed from below upward, and from without inwards, which opens on the surface of the vulvar mucous membrane, in front of the hymen in the retreating angle between this membrane and the wall of the vulva. When the hymen is broken up, the orifice is found in the corresponding angle between the carunculæ myrtiformes and the wall of the vulva. It is often difficult to detect, but is sometimes large enough to admit a probe. The constituent parts of the gland are a fibrous envelope, lobules formed of a great number of granulations, whence issue the excretory canals, arteries, veins, lymphatics, and a few nervous filaments. This gland is the analogue of the glands of Méry and of Cowper in man.

The Secretory Apparatus of the External Genital Organs.—The secretory apparatus of the external genital organs is exclusively constituted—with the exception of the vulvo-vaginal gland—of sebaceous glands in clusters, and of some sudoriparous glands, the last being found only on the external aspect of the labia majora. The sebaceous glands increase in number and diminish in size from the external aspect of the labia majora to the internal aspect of the labia minora. On the border of the labia minora they suddenly cease. There is no trace in the vestibule. The muciparous follicles of the vestibule, meatus and urethra, say C. A. Martin and Leger,* described by authors do not exist; they have probably been mistaken for mucous crypts. The sebaceous glands of the labia minora do not exist in the fœtus; they only attain complete development at puberty; after the menopause they undergo atrophy, as well as those of the inner aspect of the labia majora. During pregnancy they acquire a greater size than at any other period.

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* "Arch. Générales de Méd," 1862.

CHAPTER II.

CONDITIONS INDICATING NECESSITY FOR LOCAL EXAMINATION: DISORDER OF FUNCTION—DISTANT AND CONSTITUTIONAL REACTIONS—THE SUBJECTIVE SIGNS OF LOCAL DISEASE INDICATE APPEAL TO OBJECTIVE SIGNS—COMPARISON OF STUDY OF DISEASE OF PELVIC ORGANS WITH THAT OF SKIN AND EYE—DISTURBANCE OF FUNCTIONS OF OVARIES, UTERUS, AND VAGINA—AMENORRHŒA, REAL AND OCCULT; MENORRHAGIA; DYSMENORRHŒA—ABORTION—DISCHARGES: LEUCORRHŒA, MUCOUS, ALBUMINOUS, WATERY, GASEOUS, PURULENT, HÆMORRHAGIC, FLESHY, MEMBRANOUS—NERVOUS PHENOMENA: PAIN, LUMBO-DORSAL, INGUINAL, PELVIC, IRRITABLE OVARY, IRRITABLE UTERUS, MASTODYNIA, NEURALGIA, SPINAL IRRITATION, PARAPLEGIA, MENTAL DISORDER, REFLEX NERVOUS PHENOMENA, VOMITING, CONVULSION, EPILEPSY, HYSTERIA—DYSPAREUNIA, VAGINISMUS—STERILITY.

There is nothing special in the mode of studying the diseases of women. Just as the ophthalmic surgeon is led to examine the eye because the patient complains of loss or disturbance of its function, or because he feels pain in it, or has some other subjective symptom referred to that organ, so by disturbances of function or some other subjective sign are we led to the discovery of disease of the sexual organs. When the function of an organ is disturbed, the *primâ facie* inference is that the organ itself which constitutes the mechanism by which that function is performed is out of gear. This is not indeed always absolutely true; because an impaired state of the blood, or disordered innervation, or derangement of another organ, may entail the functional disorder which arrests our attention. The genital organs are no exception to this proposition. The functions of the ovaries, uterus, or vagina may be seriously deranged by a state of anæmia or blood-poisoning, by disease of the nervous centres, by disease of the heart, lungs, or liver. These functions may be even more seriously affected by mechanical pressure in contiguous parts. Still the fact remains that we can hardly appreciate rightly or successfully treat these primary or correlated diseases if we do not take into careful consideration the state of the genital organs themselves. The general or distant affections require to be investigated and treated; but it is not safe to overlook the organs that may be secondarily involved.

It is needless to say that every woman who is ill and seeks advice does not suffer from disorder of the sexual system. She may labour under various constitutional disorders, and under disorders of parts of the body quite independent of the sexual system. On the other hand, general or local disorders may in their course react upon, and induce disorder in, the sexual system. And there are disorders of this special system, commencing in it, and in their turn reacting upon, and inducing disorder in, distant organs or in the general system.

These inter-reactions are exceedingly frequent. Indeed, it may be affirmed that no severe constitutional disorder can long continue in a woman during the predominance of the ovarian function without entailing disturbance in this function. And the converse is also true, that disorder of the sexual organs cannot long continue without entailing constitutional disorder, or injuriously affecting the condition of other organs.

These facts point to the necessity of guarding against the error of fixing our attention too specially upon one particular class of symptoms or upon one organ. Whilst searching out the part which is more especially the seat of diseased action, we must be careful not to overlook possible disease elsewhere, and not to neglect to observe the mutual reactions. The clinical physician, although led by the intuition of experience to seize quickly upon the offending part, will not omit to pass under review the state and working order of the other parts. In this manner most important complications are often brought unexpectedly to light; and in every case some useful indication in treatment is discovered. The late Professor Chomel, a man of admirable skill, sagacity, and judgment, never failed, when a new case of disease came under his care, to interrogate successively every function. Thus, I have seen him in a case of pneumonia, the signs of which at once arrested attention, proceed nevertheless to explore the abdomen, the uterus, and the rectum. This may look like carrying out a principle to extremes. Yet who shall say that Chomel, as a clinical teacher or as a physician, was wrong?

It is not, indeed, necessary in ordinary practice, to follow out in rigorous completeness the plan which to the clinical professor may seem desirable. It will therefore be useful to ascertain *what are the leading symptoms which, alone or grouped, indicate such disorder of the sexual organs as to call for direct exploration?*

This is the question we have set before us: When a woman presents herself, complaining of certain symptoms, chiefly subjective, some, or perhaps none, referred to the pelvis, how are we to act? Will these subjective symptoms enable us to refer them to their cause, to establish a diagnosis, to give satisfactory indications for treatment? Hardly. We must therefore call to our aid the objective signs; we must weigh and determine the significance of these before we can arrive at a conclusion at all precise or trustworthy as to the underlying pathological condition. The whole tendency of modern medicine is to subject every organ which manifests functional disorder to direct physical exploration, in order that it may solve the question presented obscurely by the subjective signs. The sound, the probe, the stethoscope, the laryngoscope, the otoscope, the ophthalmoscope, the various forms of speculum, are only so many contrivances for enabling us to project the senses of touch, sight, and hearing into the internal structures. In the case of the skin, all is at once exposed to direct observation; and, as Alibert remarked, we should be glad to have the same advantage in investigating and treating the diseases of the heart, lungs, liver, kidneys, and nervous centres. Why is it that the study of the pathology of the skin and of the eye is invested with such fascinating interest? Those who devote themselves with the greatest zeal and success to this study affirm that it is because the skin and the eye reveal their condition directly to the senses, and thus furnish not only positive objective signs which the patient can neither suppress nor misrepresent, but also because by this direct observation of the skin and eye they can read and follow, as on a map or on a telegraphic dial, the working of distant organs and of many affections of the general system. Here, then, we see how the reputed special practitioner, turning to account his special experience, often acquires an insight into general pathology denied to those who neglect the lessons they might read upon the visible organs.

This advantage we possess to a great extent of perfection in the case of the pelvic organs. It is by the proper use of this advantage that so great a degree of precision in knowledge, and of success in treatment of diseases of women, has of late years been attained.

And there is one property in a high degree characteristic of the instruments employed in the investigation of the diseases of women of such singular value that it ought to completely silence the objections at one time so passionately urged against them. It is this: the instruments have a therapeutical as well as a diagnostic application; the speculum, for instance, revealing a lesion, often enables the surgeon at once to apply his remedy. Thus treatment follows upon the track of diagnosis one sitting and one operation serving for both.

Here then, as in medicine generally, our first indication of the direction in which we have to look for the disease which causes the patient to complain, lies in the disturbance of function. We have therefore to consider what these functions are. The first in importance, because it is continued with occasional interruptions throughout the period of active sexual life, is *menstruation.* The other functions are incidental to married life only; these are *the relation to the other sex, pregnancy,* and *lactation.*

Most of the diseases which attack the ovaries and uterus, whether primary or secondary, entail some disturbance in the menstrual function. The flow is diminished, or in excess, or its periodicity is deranged. It is attended with pain in the pelvic organs and other nervous phenomena.

We shall discuss the history of amenorrhœa, menorrhagia, and dysmenorrhœa hereafter. Our object now is simply to determine the conditions which suggest local examination. In the great majority of cases of *amenorrhœa* in single women, no local exploration is necessary; but in some cases it becomes imperative: for example, amenorrhœa is sometimes *presumptive* only—that is, the secretion takes place, but owing to some imperfection of structure it is retained in the cavity of the uterus or vagina. This may be called *occult menstruation.* The suffering becomes urgent in the highest degree, and nothing short of an operation which shall liberate the retained secretion will save the patient. Some cases again of suppressed menstruation, leading to effusion of blood behind the uterus, setting up circumscribed peritonitis, and displacing the uterus so as to press upon the bladder, may cause retention of urine. Here again local examination is imperative. This may be said of every case of retention of urine.

Menorrhagia is a relative term; that is, some women lose much more than the average without suffering in health; but whenever the loss continues profuse, obviously entails anæmia and general debility, and persists in spite of internal remedies, local examination is clearly necessary. We shall often find a sufficient local cause in polypus, tumour, inflammation, congestion, hypertrophy, displacement, or malignant disease, all of which conditions require local treatment.

When we come to study the history of *dysmenorrhœa* we shall find abundant proof of the almost constant association of this disorder with a mechanical condition of the uterus impeding the easy performance of the function. So long, however, as the distress does not clearly affect the general system, so long as it does not exceed endurable bounds, and if it appears to be moderated by general remedies, it is not necessary to examine; but, in the contrary condition, examination should not be long postponed. To postpone examination is to postpone discovery of the cause and effective treatment. This is more especially imperative in the case of a married woman in whom dysmenorrhœa is complicated with "dyspareunia" and sterility. Abortion, if not primarily depending upon some local disease or displacement of the uterus, is so very likely to be followed by some such condition that an examination should be instituted. If a sanguineous discharge, even periodical, resembling menstruation, goes on during lactation, especially if it be excessive in quantity, and attended by leucorrhœal discharge, it may be almost confidently predicated that there exists some uterine disorder requiring local treatment.

I have used a new word, "*Dyspareunia*." It is incumbent upon every one who coins a new word to explain its meaning and to justify the innovation. Just as the word "dysmenorrhœa" has been coined in order to express compendiously the condition of difficult or painful menstruation; just as "dyspepsia" is used to signify difficult or painful digestion,—we want a word to express the condition of difficult or painful performance of the sexual function. Such a word would be convenient in many ways. It would enable us to avoid the longer and coarser terms in use, by substituting a single word at once euphonious, expressive, and in harmony with medical language. After consulting Dr. W. H. Stone, I have adopted the word "dyspareunia." It is derived from δυσπάρευνος, a word used in this sense by Sophocles. However disagreeable the topic may be, it is impossible to escape reference to a function so important. Dyspareunia in the female is perhaps the most absolute of all the indications of local malformation or disease. It calls the most imperatively for local examination as to its cause. In its milder forms it may make the sufferer's life a course of physical and mental wretchedness; in its severe forms it virtually unsexes her; and in any form it may lead to the most disastrous social calamities.

Taking this condition, dyspareunia, as a symptom of disordered function, we shall be astonished, when we proceed to direct examination of the organs concerned, at finding how many those causes may be, and what a wide field of pathological inquiry is associated with it. For example, there may be original defect or malformation; there may be obstructing tumours or growths, inflammation, dislocation or altered form, disordered innervation. In short, almost every disease to which the sexual organs are liable may entail dyspareunia for one of its consequences; and in not a few of these diseases disregard of this symptom may entail positive danger.

The existence of *certain discharges,* such as blood, under conditions of quantity and times of occurrence which distinguish it from normal menstruation, mucous, purulent, albuminous, aqueous, fleshy, or membranous, if at all protracted, point clearly to some local disorder as their origin.

Then there are some subjective signs, as *pain,* lumbo-dorsal, iliac, pelvic, or crural, and a sense of bearing down or pressure upon the rectum or bladder, associated with disorder in the function of these organs. These, especially if connected with abnormal discharges and other symptoms, call distinctly for local investigation.

Then we must observe the *constitutional or remote effects* of the foregoing conditions. Disorder of the pelvic organs seldom goes on long without entailing anæmia, disordered digestion, hyperæsthesia, neuralgia, or other manifestations of nervous derangement or prostration. When these conditions are observed in association with marked signs of derangement of function of the pelvic organs, the necessity for exploring the physical state of these is as clear as is that of examining the state of the heart or lungs when these organs perform their function with distress, and the whole system suffers.

Such, then, is a summary view of the conditions, chiefly subjective, which point out to us the desirableness of instituting direct observation of the pelvic organs. This direct observation commonly enables us to analyze the groups of subjective symptoms; to determine the cause and significance of each, separately and collectively. It always brings to our assistance the discovery of other symptoms, entirely objective; and almost always puts it in our power to apply the proper treatment.

The special study of the significance of the several symptoms of pelvic disease, subjective and objective, will be traced in subsequent sections.

We have ranked discharges amongst the most pressing indications for instituting local exploration. In health it may be said that, excepting the monthly discharge of menstruation, there is no escape of fluid from the vagina. It is true that in some women leucorrhœa to a moderate extent precedes and follows the menstrual sanguineous flow; it is also true that in some, leucorrhœa continues throughout the intermenstrual period without in any obvious way entailing local or constitutional distress. Admitting this, the rational and safe rule in practice still is, to examine in all cases where a discharge at all copious escapes from the vagina attended by pain and signs of constitutional impairment. This may be stated as a general proposition without distinction as to the nature of the discharge. But we will now examine what the discharges are, and what is the special significance of each. And, *in limine*, let us agree upon the meaning to attach to two words which we shall frequently have occasion to use. "Secretion" and "excretion" must be accurately applied. Following Continental custom, I shall use the word "secretion" to distinguish the act of separation of the discharge from the free surface of the organs; and the word "excretion" to distinguish the act of voiding from the body altogether. To take an example: the menstrual fluid may be poured out from the mucous surface of the Fallopian tubes and uterus—that is secretion. The escape of the fluid by the vulva is excretion. Excretion is the natural complement of secretion. But the process may stop short at secretion—that is, the secreted fluid may be retained. Thus, if there be occlusion of the genital canal at any point below the os uteri internum, the secreted menstrual fluid will be shut up in the cavity of the uterus and in the Fallopian tubes. There is no excretion, and therefore, apparently, no secretion.

Taking the discharges as they first come under the notice of the clinical observer, that is, after their excretion, they may be roughly classed under the following heads :—1. Sanguineous. 2. Mucous. 3. Purulent. 4. Watery. 5. Membranous. 6. Solid or fleshy. 7. In the case of fistulous openings into the bladder or rectum, urine or fæces may escape. 8. Then there are foreign matters, fluid or solid, which find their way into the uterus and vagina from without. Amongst these may be mentioned semen distinguished by spermatozoa. 9. On rare occasions true hydatids have escaped by this route.

If we limited our inquiry to the examination of these discharges when excreted, we should hardly attain to any more precise knowledge than is expressed in the general terms by which we have designated them. We cannot arrive at a certain knowledge of their source, or form a trustworthy estimate of their pathological significance, unless we examine minutely the organs from which they are secreted.

I may state another proposition : most of the diseases of the uterus and vagina are attended by discharges. But it must not be assumed that, when no discharge exists, or is noticed by the patient, there is no disease. Serious disease of the ovaries and uterus may exist for a long time without being attended with any discharge. And still more frequently discharges are overlooked by the patient, but become obvious enough on examination.

Of all the discharges the only one which can be called strictly normal is blood ; and this is only normal within certain conditions of circumstance, time, and quantity. Previous histological study will lend the most material aid to direct observation in determining the sources and significance of discharges. We may start from the proposition that, with one or two rare exceptions, all the discharges we have to deal with come from mucous membrane, or at least from organs normally clothed by mucous membrane. The discharges will generally bring with them some of the distinctive elements of the part of the mucous tract from which they are secreted. Hence microscopical examination of a discharge will almost always reveal epithelium-cells which tell their own tale as to the region they come from. In this way we can distinguish uterine mucus from vaginal.

Nearly the whole genital tract secretes mucus. It is only when excessive in quantity, or altered in quality, that the secretion of mucus acquires a pathological significance.

The natural mucous secretions are :—

1. A *whitish mucus from the Fallopian tubes and cavity of the uterus proper.* This probably comes principally from the uterine glands. It has an alkaline reaction. It is distinguished under the microscope by the presence in it of columnar ciliated epithelium-cells. In health this secretion is moderate in quantity, and attracts no attention. But in the condition known as uterine catarrh it is very abundant, sometimes, especially in aged women, accumulating in the uterine cavity, and causing colic pains to expel it. The uterine mucous membrane may also be stimulated to excessive secretion by gonorrhœal infection spreading from the vagina.

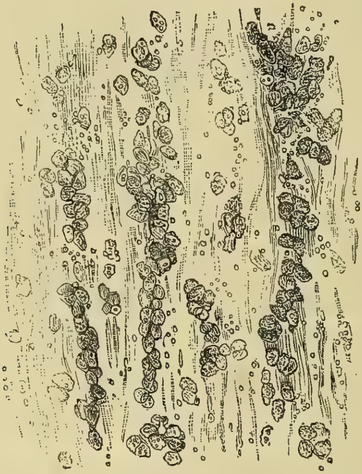

Fig. 35.

MUCOUS DISCHARGE FROM THE HEALTHY CERVIX UTERI, TAKEN FROM THE MUCOUS CRYPTS. THE MUCOUS CORPUSCLES ARE ARRANGED IN STRINGS BY THE VISCIDITY OF THE PLASMA IN WHICH THEY ARE ENTANGLED—(AFTER TYLER SMITH AND HASSALL).

2. A *transparent viscid mucus in the cervix uteri.* This is also alkaline. It consists chiefly of mucous corpuscles, caudate corpuscles, minute oil-globules, and occasionally dentated epithelium, all entangled in a thick tenacious plasma (see Fig. 35). In health this secretion is rarely formed in such excess as to appear externally, but it is almost always found in the cervix filling up the canal. The mucous plug thus formed is washed away at each menstrual flow; it exists generally throughout pregnancy. Its uses are probably to shut off the uterine cavity, so as to protect it from external agencies, and to form a suitable medium for the passage of the spermatozoa. At the beginning

of labour this secretion is formed in increased copiousness, and serves to lubricate the passages, and to facilitate their dilatation. In certain morbid conditions the cervical glandular structure also acquires extraordinary activity, and then the proper cervical mucus assumes the character of a *discharge.* It is poured in large quantity into the vagina, so freely, indeed, as to be a serious drain upon the system, and a source of weakness. It constitutes the most frequent form of so-called "whites" or leucorrhœa. If the speculum be used it may be seen issuing from the uterus as a glairy, albuminous fluid, resembling unboiled white of egg. This exaggerated secretion is almost always the consequence of inflammation, more or less acute, of the cervical canal, or of a condition analogous to catarrh of the bronchial or intestinal mucous membrane.

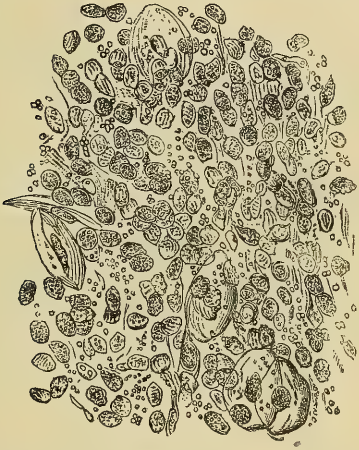

Fig. 36.

MUCOUS CORPUSCLES, EPITHELIAL PARTICLES, AND OIL GRANULES FROM CERVICAL LEUCORRHŒA (AFTER TYLER SMITH AND HASSALL).

3. A *mucus consisting of plasma,* not viscid, but containing multitudes of *scaly epithelium-cells.* This comes mainly from the external surface of the cervix uteri, labia uteri, and the fundus of the vagina. It is of acid reaction. The proportion of epithelial cells to that of the fluid plasma varies considerably. In some cases the fluid part is so scanty that the secretion adheres to the mucous membrane, covering the os uteri as with flakes, or a layer of opaque yellowish-white friable membranous-looking substance, simulating and suggesting diphtheria. It often adheres in the form of a thick layer upon india-rubber pessaries. Under the microscope this is found to consist almost entirely of scaly epithelium and oil-globules. In other cases,

the plasma being a little more abundant, the secretion looks like cream or pus. But in these cases the microscope reveals the same constituents—namely, scales of epithelium. These forms of secretion depend upon chronic or subacute inflammation of the mucous membrane—vaginitis, not necessarily accompanied with abrasion or ulceration. The puriform mucus, more or less opaque and viscid, varying in tinge from creamy-white to yellowish or light green, is often due to gonorrhœal infection, or to suppuration from surfaces denuded of epithelium and granulating. When due to gonorrhœal infection the mucous membrane from os uteri to vulva is swollen, angry-red, and painful, and the meatus urinarius exhibits the same characters. The creamy form of secretion is frequently found during pregnancy on the vaginal portion of the uterus. It is the result of the active throwing off of squamous epithelium due to hyperæmia.

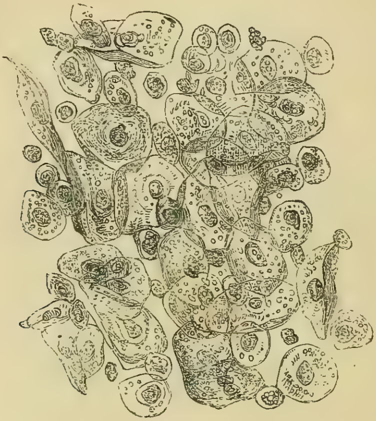

Fig. 37.

EPITHELIUM FROM VAGINAL LEUCORRHŒA—(AFTER TYLER SMITH AND HASSALL).

4. The remaining or lower tract of the vagina secretes an *acid mucus.* Under morbid states this sometimes contains pus-globules, an infusorium, the Trichomonas vaginalis of Donné, and a fungus, the Leptothryx buccalis of Robin. But the parasites are really mainly due to neglect of cleanliness. Whitehead suggests that the use of the acid of the vaginal mucus is to prevent the coagulation of the catamenial fluid in the vagina. It certainly seems to possess the property of coagulating the alkaline mucus coming from the cervix. I doubt the correctness of Whitehead's theory. It is important that the blood should not coagulate in the uterus, because clots there cause severe pain and congestion, and are apt to keep up

hæmorrhage; but a clot in the vagina is of little consequence. Pus stops coagulation; so does mucus, provided the proportion of blood is small. I believe it is the normal mucus which maintains fluidity. Whenever the proportion of blood is greatly in excess it is apt to coagulate.

5. There is a *clear viscid secretion from Bartholini's glands,* which is discharged in jets during copulation. It has been seen to escape on irritation, expelled by the action of the muscular fibres in the ducts. It is also poured out freely during labour, serving to lubricate the vulva.

6. The small sebaceous and mucous glands of the vulva and labia majora secrete an *oily mucus,* serving for lubrication. This is sometimes increased in quantity, becoming puriform.

We may here refer very briefly to one or two other points connected with mucous discharges. Donné says when the acidity of the vaginal mucus, or the alkalinity of the uterine secretion, is morbidly exaggerated, the spermatozoa are killed. Hence one explanation of the frequency of sterility when there is inflammatory disease of these parts; and of the occurrence of pregnancy when the disease which gives rise to the morbid secretions is removed. One proof of the alkaline property of the cervical mucus is seen when the cotton, impregnated with tincture of iodine, is passed into the cavity of the cervix: the colour is discharged.

THE SIGNIFICANCE OF THE DISCHARGES: LEUCORRHŒA; WATERY DISCHARGES; PURULENT DISCHARGES; BLOOD DISCHARGES; GASEOUS OR AERIFORM DISCHARGES.

The preceding summary of the various mucous discharges will enable us to estimate more accurately the history of *leucorrhœa.*

Although leucorrhœa, or white discharge, is generally a symptom only, and not an essential morbid condition, it is necessary to study its history and significance separately from the morbid conditions which produce it. In a considerable number of cases leucorrhœa may be regarded as a catarrh of the uterine or vaginal mucous membrane analogous to catarrh in other mucous tracts. We accordingly see not infrequently that leucorrhœa is cured or cures itself without topical treatment. I have drawn attention to the fact that the uterine mucous membrane is subject, like other mucous membranes, to epidemic influence. For example, whilst in some this influence would affect the alimentary canal causing diarrhœa; whilst in others, or at other seasons, it would cause bronchitis or pneumonia; in some women it would give rise to uterine catarrh. Not a few women have leucorrhœa whenever the weather is cold. This is explained in some cases by sudden changes of temperature, checking the secretions of the skin; in other cases the direct exposure of the patulous vagina to draughts of cold air, as from using an open privy, has appeared to be the cause. Certainly, I have known this cause to bring on pelvic cellulitis and peritonitis in patients who were predisposed by recent delivery, or the recent performance of operations on the pelvic structures.

In the article "Leucorrhée," in the *Dictionnaire des Sciences Médicales,* facts illustrating the occasional *epidemicity* of leucorrhœa are referred to on the authority of the physicians of Breslau, in 1702; of Morgagni, in 1710; of Bassius, in 1730; by Raulin, at Paris, in 1765; and by Leake, in England.

Certain forms of leucorrhœa may be regarded as *physiological.* Amongst these may be classed that excessive secretion of mucus which often attends the hyperæmia of pregnancy. This may not always be so profuse as to escape externally and attract the notice of the subject; but it is rarely absent, and by the speculum it is seen as a white opaque secretion of creamy consistency, occupying the bag of the fundus and furrows of the vagina. This secretion also consists chiefly of epithelium scales. If the vaginal mucous membrane exhibit with this secretion a deep violet-red or purple colour, and prominent rugæ or brain-like corrugations, the presumption in favour of pregnancy is great.

This form of leucorrhœa requires no treatment.

Another form of leucorrhœa which may be called physiological, is that pale mucous discharge which precedes and follows, but chiefly follows, the proper menstrual flow. The first effect of the flux which takes place under the ovarian nisus, is to stimulate the glands of the uterus to increased activity. Hence the secretion of mucus in larger quantity, which sometimes appears externally before the proper menstrual blood exudes and mixes with it. This increased secretion of mucus goes on all through the stages of menstruation, and persists for a while after the exudation of blood has ceased. This post-menstrual leucorrhœa may be likened to the so-called "green-waters" of childbed. It flows from the uterine cavity, as does the proper menstrual discharge.

An allied variety of this form of leucorrhœa is that which is often witnessed in girls who do not menstruate properly. In these cases, leucorrhœa is the substitute for the healthy menstrual sanguineous flow. It is evidently the result of an imperfect menstrual molimen. It is provoked by ovulation more or less perfect. It may, therefore, with strict justice be called *menstrual leucorrhœa.* It is more especially prevalent in chlorotic girls, and then may degenerate into a morbid flux.

What has been said about physiological leucorrhœa sufficiently proves that inflammation is not a necessary factor. Indeed, inflammation may exist without leucorrhœa, and leucorrhœa without inflammation. In the great majority of cases of leucorrhœa, uterine, vaginal, or vulvar, there has been no history of inflammation. Those forms which are more directly traced to inflammatory conditions, as acute and chronic catarrhal metritis, will be more conveniently discussed when describing the pathology of the uterus.

Leucorrhœa may be the expression of a constitutional diathesis. Thus the strumous diathesis is known to be commonly attended by a tumid development of the mucous membranes generally, and a disposition to glandular engorgements. Girls and women possessing this diathesis are frequently the subjects of leucorrhœa without showing any special alteration of the genital mucous membrane. But occasionally there is a distinct tuberculous condition of the mucous membrane. When this is the case, the attendant leucorrhœa is peculiarly intractable, even incurable.

Leucorrhœa is not uncommon in women suffering from tubercular disease of the lungs.

The syphilitic diathesis produces analogous effects; and that not only when the diathesis has been acquired by primary infection, or through the gestation of an infected ovum, but also when the diathesis has been transmitted hereditarily.

The gouty and the rheumatismal diatheses are described by some writers as disposing to leucorrhœa, and that of a very obstinate form.

In certain states of great debility, marked by anæmia and defective nutrition of the tissues, mucous fluxes are easily excited, and the genital mucous tract is especially prone to be so affected. In such cases there need be no inflammation, no breach of surface, no abnormal growth. The coats of the vessels, the tissues of the mucous membrane, the muscular structure of the uterus are all so deficient in tone and contractility, and the blood is so wanting in plasticity, that an exudation of the watery element, mingled with mucous secretion, readily takes place. This state of anæmia may be induced by various causes, as acute or chronic disease, hæmorrhages, or by over-suckling. It may also be induced by town-life and unhealthy occupations pursued in bad hygienic conditions. Accordingly, leucorrhœa is believed to be more frequent in towns than in the country, although the statistics cited to prove this position are by no means free from fallacy. The feeble, relaxed state of health induced in Europeans living in tropical climates, is certainly often attended by leucorrhœa; and in this we see another example of the relationship between leucorrhœa and hæmorrhage. Thus, I have known instances of women who always suffered from leucorrhœa whilst in India, remain free whilst staying in England.

Diet has been supposed to have some influence in the production or promotion of leucorrhœa. No doubt a diet deficient in nutritive power may, by inducing general debility, favour the occurrence of leucorrhœa; and it is equally certain that a good nutritive diet, by imparting tone and general health, will tend to prevent or cure leucorrhœa; but I am not aware of any precise observations to prove that any particular articles of food have a distinct or specific action in promoting leucorrhœa.

Leucorrhœa is common in association with disorder of the digestive organs. Dyspepsia, flatulence, distension of the stomach and abdomen, constipation or diarrhœa are frequently observed. To determine which was the antecedent disorder is not always easy; but this much is certain: almost all the dyspeptic women who have copious leucorrhœa, and in whom physicians are so ready to explain the leucorrhœa by the disorders of digestion, have uterine disease. Leucorrhœa rarely lasts any considerable time without entailing dyspepsia and mal-nutrition. Leucorrhœa may, however, be an expression of vascular turgescence, the result of difficulties associated with the liver, kidney, or heart. How local hyperæmia, depending upon remote or general causes, may give rise to leucorrhœa, is well illustrated in the hypersecretion of pregnancy.

Leucorrhœa is frequent among women who follow sedentary occupations, and in whom the bowels are habitually loaded. I have known women who were leading a fairly active life always subject to leucorrhœa when their bowels were constipated. The same condition favours menorrhagia.

But after making every allowance for the influence of disordered digestion, and of other distant or indirect factors in producing leucorrhœa, the fact remains that in the great majority of instances, after childhood, leucorrhœa is dependent upon some uterine abnormality. I may repeat what I have already said that almost every morbid condition of the uterus is liable to be attended by discharge. When there is acute or chronic endometritis, abrasion, tumour, polypus, or displacement, leucorrhœa is rarely absent. Hence the significance of leucorrhœa as a symptom pointing to uterine disease. Generally it may be stated that *when leucorrhœa is constant it is* significant of uterine disease, that is, of a persistent cause; and that *when intermittent,* that is, ceasing between the menstrual epochs, it is of purer physiological import.

In women who are in any way constitutionally predisposed to leucorrhœa slight causes will provoke it. Excessive exercise, as in walking, excess in sexual indulgence, the wearing a pessary, in short, almost any local irritation is sufficient. When there is no special predisposition, the like causes long acting may provoke leucorrhœa. The presence of a tumour in the wall of the uterus attracting an undue quantity of blood, the chafing of a polypus against the walls of the cervix or vagina, or even the presence of a hypertrophied vaginal portion will seldom fail to produce leucorrhœa.

The division of leucorrhœa into *uterine, vaginal,* and *vulvar,* as propounded by Donné and Tyler Smith, is based not less on clinical than on anatomical foundation. As we have seen, the microscopical and chemical analysis exhibits distinctive characters, and the pathological history too is often different. It may be stated as a general proposition, one admitting, indeed, of numerous exceptions, that vulvar leucorrhœa is more peculiar to childhood, vaginal to young women, and cervical and uterine to middle and advanced age. All the forms may co-exist in the same patient, but in many one may exist alone. This is especially the case with the vulvar leucorrhœa of children. It is also often true of the vulvar leucorrhœa attending pruritus in aged women. The characters of the discharge in vulvar leucorrhœa are different at different ages. Thus in children in whom the sebaceous glands are not yet developed the discharge is serous or sero-purulent, resembling that which results from eczema of the skin. At puberty, and during the child-bearing epoch, the same kind of sero-purulent secretion may exist, but it is commonly mingled with the proper secretions of the vulvo-vaginal glands and of the sebaceous glands which are at the acme of their development at this time. The secretion will be viscid, unctuous, giving a characteristic cheesy or fishy odour. The vulvar leucorrhœa of advanced age reverts to the characters of infancy, the sebaceous follicles having in great measure disappeared from atrophy.

Vaginal leucorrhœa at all ages consists essentially of an exaggerated formation and shedding of pavement epithelium-scales (see Fig. 37). In many instances a great part of the fluid element of the vaginal discharge arises from the cervical cavity.

Cervical leucorrhœa is most frequent in the child-bearing period. It is chiefly mucous; it exhibits the characters seen in Figs. 35, 36.

Uterine leucorrhœa or catarrh will vary in character according to age. During the child-bearing epoch the uterine glands contribute a quantity of mucus to mix with the epithelial *débris.* At a later period the epithelial *débris* assume a creamy or milky consistence from fatty metamorphosis and the admixture with a serous exudation. In all the cases pus may be found if there is breach of surface, as from ulceration and granulation. Uterine and cervical leucorrhœa is a frequent attendant upon dysmenorrhœa, especially of that form which is characterized by partial retention. If there be atresia or narrowing at the os externum, the congestion consequent on the futile attempts of the uterus to expel its contents excites to increased activity of the uterine and cervical glands. And the product of this increased activity finding in its turn difficult escape, tends to accumulate, and to dilate the cavities of the cervix and body of the uterus. Thus spasm or colic is excited, and the mucous accumulation may be expelled *en masse.* It is in this way we account for the frequently intermittent character of leucorrhœal discharges.

If called upon to describe summarily the distinguishing characters of uterine, vaginal, and vulvar leucorrhœa, we might say that the first is mucous, the second epithelial, and the last sebaceous. The somewhat greasy character of vaginal leucorrhœa is mainly attributable to the fatty metamorphosis of the epithelial scales.

The leucorrhœa of children deserves careful attention. The occurrence of a discharge being often attended with local irritation, the child is likely to resort to friction or scratching for relief. The redness and tumefaction thus added to the discharge are very apt to excite suspicions of foul play, and thus to lead to false accusations. It is therefore in the last degree important to bear in mind the conditions under which leucorrhœa in children may arise, lest we too hastily adopt the suspicions that may be suggested to us by others.

Many years ago* I made the observation that acute exanthemata, as small-pox and scarlatina, which we know affect the whole mucous tract, as well as the skin, occasionally left, as sequelæ, vaginitis and leucorrhœa even in children. Graves, Scanzoni, and others have confirmed this observation.

Strumous children are especially subject to vaginal and vulvar leucorrhœa. Irritation of the rectum as from ascarides, commonly produces it. In children of this taint it alternates with, or accompanies crusta lactea or impetigo, herpes, eczema. It is said to be due to the irritation of teething, but this I have not noticed, except in cases where a strumous diathesis offered a sufficient explanation.

In many cases the vulvar leucorrhœa in children is kept up by neglect of cleanliness.

The principal features which would favour the conclusion that leucorrhœa observed in a child is due to a criminal attempt, are: marks of contusion, swelling, ecchymosis, turgescence, of the vessels of the vulva and vagina; extreme rapidity and intensity of the disease. If there was gonorrhœal infection, then there will be a purulent discharge, greenish-yellow in colour, copious enough to bathe the external parts and to stain the linen, thick enough when drying to glue together the lips of the vulva, and flowing equally from the vagina and urethra. This urethral complication is especially important, for according to Tardieu, violence done to the sexual organs of a child by a healthy man may produce an inflammation as acute, and a discharge as copious and thick, as that done by a man affected with gonorrhœa.

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* "Medical Gazette," 1850.

It is obvious from the foregoing considerations that the greatest possible circumspection is necessary before committing one's self to the expression of a positive opinion as to the origin of an apparently virulent discharge in a child.

A question which has attracted some attention is this: Does the leucorrhœal discharge by contact with the mucous membrane, on whose surface it is retained or over which it flows, exert any irritating or injurious action? We frequently find associated with leucorrhœa patches of the surface of the vaginal portion denuded of epithelium, small ulcerations they may be called, a state of tumefaction, even redness. Are these caused by the leucorrhœa? In the majority of cases they assuredly are not. They mostly take their origin in those processes which produced the leucorrhœa as well. They are frequently the consequence of labour or abortion, during which processes the cervix uteri undergoes severe injury. It is conceivable, however, that long-continued maceration of a mucous membrane in leucorrhœal fluid may effect some alteration, as softening of its tissue, and this, leading to excessive exfoliation of its epithelial layer, may facilitate the denudation of the basement layer. This would be especially likely to happen under the influence of any unusual accidental irritation, as excessive walking or sexual indulgence. Dr. Tyler Smith, however, submitted that sometimes the discharge possessed decided acrid or irritating properties, capable of directly inducing ulcerations, granulations, follicular cysts, and other disorders. That is, he looked upon leucorrhœa as a primary disease. This opinion appears to me to want confirmation. It is intelligible that the permanent increased turgidity of vessels, and the consequent altered condition of the tissues attending habitual leucorrhœa, may in the end entail the alterations named. But this is a different thing from their direct production by the irritating property of the discharges.

If fluid be retained inside the cavity of the uterus, then it will act mechanically according to hydrostatic laws. It then excites contractile efforts of the uterus, and as the fluid does not escape, or only partially, the equal eccentric pressure of the fluid against the walls of the containing cavity leads to the dilatation of this cavity. Its retention on the surface of the mucous membrane would also interfere materially with the performance of some at least of the functions of this membrane, as, for example, the healthy course of menstruation and the carrying of spermatozoa.

There is, however, reason to believe that the sebaceous secretion of vulvar leucorrhœa, if retained, may become especially offensive and acrid, and keep up or produce an inflammatory state of the tissues bathed by it. Another question has been started: Can the secretions classed as leucorrhœa be absorbed, and give rise to constitutional toxæmia? I content myself with citing the question. I know of no precise evidence to support an affirmative answer. There is, however, evidence to show that such poisons as lead, carbolic acid, chromic acid, used to vaginal surfaces bared of epithelium, may be absorbed, and produce their specific toxical effects on the system.

It is also certain that foul secretions retained *in utero* may be taken up into the uterine veins and lymphatics, and give rise to inflammation of the broad ligaments, peritonitis, and general septicæmia. This is especially the case in the puerperal state after childbirth at term and after abortion, and also from cancerous ulceration.

But these facts, although proving that the way is open to invasion, do not prove that the system is ever so invaded by the matter of ordinary leucorrhœa.

The *diagnosis* of the kinds of leucorrhœa from each other is sometimes presumptive, sometimes almost absolute. It is generally presumptive in cases of constitutional disorder, as in strumous or chlorotic girls, in whom it may be reasonably inferred that there is no uterine lesion, and in whom physical exploration is not pursued. Diagnosis is still presumptive, even in married women who have had children, until local examination is made. The sources of the discharge may be demonstrated by the speculum. We may actually see the viscid albuminous secretion coming out of the cervix. So again in the chronic uterine catarrh of old age, with atresia of the os externum, and in that form which is associated with dysmenorrhœa from retention, we may by dilating the os uteri give vent to the retained secretion.

Not rarely, leucorrhœa exists to a very considerable degree, and yet escapes the observation or attention of the subject. Women not seldom, when questioned as to the existence of discharge, say they have none, whilst examination shows copious collection of mucous fluids in the vagina, and issuing from the cervix uteri. This arises from the patient either not being conscious of the escape of discharge, or being careless about it. Sometimes the uterine viscid secretion is expelled in a mass during defæcation, and thus is not noticed.

This unobserved leucorrhœa might be called "occult leucorrhœa." As a general rule, wherever leucorrhœa exists, other subjective symptoms are present, and indicate the expediency of examination.

Treatment.—The principle in therapeutics should be, first, to determine whether the leucorrhœa depend upon or be complicated with any constitutional diathesis or disorder. If this be determined in the affirmative, our treatment should first be directed to the correction of this complication.

The treatment, even when the leucorrhœa depends upon a morbid diathesis, is general and local. We may, for example, accomplish a certain amount of good by internal remedies and hygienic means, in producing improved general nutrition, and thus in improving the condition of the tissues, including the affected mucous membrane. And in some cases, perhaps in many, these general measures may be successful. This is especially true of the strumous and chlorotic cases. But in others, topical applications to bring about a healthier tone of the mucous membrane will be extremely useful, if not indispensable. We must not then too hastily assume that the treatment of strumous or of syphilitic leucorrhœa resolves itself into the constitutional treatment of the struma or the syphilis. When the conjunctiva is affected with catarrh or other form of inflammation which takes its rise in, or some of its characters from a strumous or syphilitic taint, we find the most precious adjuvant in topical applications to the eye. So of the skin. No less so is this the case with uterine and vaginal leucorrhœa. It would unnecessarily encumber this work to enter with any degree of detail into the general treatment of scrofula or syphilis. If I pass this by, it is not because I in any way undervalue its importance. General treatment is indispensable.

Before topical treatment is adopted, we ought to form a fairly precise diagnosis as to the source of the leucorrhœa, that is, whether it be uterine, vaginal, or vulvar. It is for want of attention to this point that vaginal injections are found to be so often useless. Vaginal injections fail, because they do not touch the main seat of the disorder, which, in the majority of cases, is in the uterus itself. But although they fail to cure, they may be useful as far as they go. In constitutional leucorrhœa, the vaginal mucous membrane as well as the uterine is commonly involved; and something is gained if we improve the condition of a part of the affected tract. There is therefore sufficient reason to prescribe them, and thus to enlist the patient in her own service. She may herself manage the vaginal injection. For the topical treatment of the uterine mucous membrane she must have recourse to her physician.

The most useful and convenient topical applications in strumous and most other forms of leucorrhœa are astringent liquids. Amongst these, acetate of lead, sulphate of zinc, sulphate of alumina, decoction of oak-bark, solutions of tannin are the best.

The topical applications best suited for the interior of the uterus are sulphate of zinc, nitrate of silver, sulphate of alumina, iodine. The best mode of applying these will be described hereafter. Emmet* extols hot vaginal injections. Their first effect is dilatation; secondly, contraction. The hips must be raised, and a properly-shaped bed-pan be placed underneath. A gallon of water at 98° F. must then be slowly injected. This must be done by a nurse. It allays local irritation, and soothes in less time than any drug.

In the case of syphilitic taint the same means are useful, but in addition I commonly use the iodide of mercury ointment, introduced by means of the ointment-carrier, I have contrived for the purpose.

In the strumous leucorrhœa of children, cod-liver oil and iron are of signal service.

The second indication is, if we discover any local disease, as a tumour, a polypus, displacement, abrasion, congestion, hypertrophy, to endeavour to remove this cause or complication.

The third indication is, in the event of our detecting no constitutional diathesis or local disease, to treat the leucorrhœa as an independent disease, if the discharge be excessive or entailing obvious local distress or general weakness. In this class of cases we should begin by correcting any disorder of the digestive organs. We should be especially careful to regulate the action of the bowels, to remove and to prevent the accumulation of fæces in the lower bowel. We should then endeavour to restore the general tone and strength by good diet, tonics, and exercise. Amongst the remedies most useful are strychnine, iron, quinine, and arsenic. The last is often remarkably efficacious in leucorrhœa depending upon debility. Local remedies, as alum or zinc injections, are often useful adjuncts; but in young women, in whom the presumption is against any morbid condition of the mucous membrane, they will be generally unnecessary, and for other reasons it is desirable to avoid them.

Balsamic medicines, especially turpentine, are often very useful, and now that they can be given in capsules, or "pearls," the chief objection to their use is overcome. Courty speaks highly of the advantage to be derived from tar-water mixed with the wine drunk at meals. It is made palatable at first by mixing with seltzer-water. The same excellent author extols hydro-therapeutics. In the chronic forms of leucorrhœa cold water in every form, as full baths or hip baths, produces the best results. It is at the same time the best revulsive and the best tonic.

In this chapter I have attempted to give merely a general account of leucorrhœa, regarding it, as for practical purposes it often is regarded, as a distinct pathological condition. Leucorrhœa, as a symptom dependent upon morbid conditions of the uterus and vagina, will be incidentally described as a part of the history of these several morbid conditions.

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* "New York Med. Journal," 1874.

The watery and purulent discharges might not inaccurately be included under the common head of "Leucorrhœa." It will be useful, at any rate, to study them in this connection.

THE WATERY DISCHARGES.

When these occur, we must first of all determine the presence or absence of pregnancy. It is no uncommon thing that discharges of water, more or less profuse, take place in pregnant women. This is the "*hydrorrhœa gravidarum.*" Gushes of water, quite clear, may occur at almost any time during pregnancy; but they are more frequent in the latter months, and especially in the last month. Happening at this time, they are commonly taken as an indication of commencing labour, and many are the false alarms which patient and doctor have to suffer from this cause. "The waters have broke," says the nurse. You go, as in duty bound, and find probably the os uteri closed, nothing resembling active labour pains. What are you to do? If you wait for labour, you may wait for a week, or two or three weeks. If, on examination, by ballottement, you find the child still floats in the uterus, the os uteri not open, and no active pains, you may go home and wait in peace for another summons.

What is the source and nature of this hydrorrhœa gravidarum? Several theories have been expounded. The character of the fluid differs in some respects from that of liquor amnii. It is odourless, and resembles blood-serum or the serous fluid effused in the peritoneal sac. Ruysch and Rœderer thought it came from rupture of lymphatic vessels, or of hydatids of the uterus; Böhmer thought it escaped from a second abortive ovum; Delamotte and Cruveilhier that it came from a cyst near the ovum: Deleurye, Puzos, Naegele, and Dubois that it came from the inner surface of the uterus, being secreted externally to the ovum. Dubois says it is the result of loosening of the membranes from the uterus when the vessels pour out serum. Hegar says the source is the uterine glands of the decidua. Thus he describes* the glands of the mucous membrane as being found in the decidua at the sixth month of gestation, and argues that their sudden disappearance in the subsequent months is improbable. In a case of hydrorrhœa he found in the decidua vera, at the beginning of the eighth month, an enormously developed glandular body. At the bottom of this morbid growth was a general hypertrophic condition of the decidua and its glands. These gave out the excessive secretions. In a case related by Dr. Graef,* repeated discharges took place, and the fœtus was expelled at the end of six months. The membranes were very delicate, and openings were found in them. In this case, it is probable that the fluid was true liquor amnii. In another case the patient suffered, during the last three months, from repeated watery discharges; the uterus rising and falling with the gathering and escape of the fluid. The membranes were found without rent. Graef regarded this as a case of catarrhal hydrorrhœa.

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* "Monatsschrift für Geburtskunde," 1863.

I believe there are various sources. In some cases the fluid is liquor amnii. This may come either from rupture of the membranes; from rapid transudation under pressure; from rapid formation and accumulation of liquor amnii in the amnion; or from the bursting of a cyst formed between the amnion and chorion, or between two layers of chorion, the proper amniotic sac remaining intact. In the majority of cases, however, the fluid is not amniotic. It is then the result of a rapid secretion from the uterine glands or from the cervical cavity. In the early months, whilst there is still a free space between the decidua vera and the decidua reflexa, there is a large area of developed glandular surface.

In one case, which was under my close observation, hydrorrhœa to the extent of a pint or more daily, occurred during the three latter months of gestation. This certainly came from the cervix. Other cases satisfy me that the cervical glands may secrete large quantities of watery fluid; and that there is generally no necessity to seek higher up for the source. This copious secretion finds analogy in the occasional free secretion of water from the stomach, and in the profuse salivation of pregnancy. As I have shown elsewhere, the entire glandular system is rendered more active in pregnancy; and the increased vascular tension of this condition is relieved by discharges, sometimes at one point, sometimes at another. I do not think it is desirable to try active means to control these discharges, which are really of physiological significance. The only true remedy is the termination of gestation, which must be awaited with patience, unless serious constitutional impairment threaten.

I have observed a *puerperal form of hydrorrhœa.* Thus watery discharges may continue for a month or longer beyond the proper lochial flow. Generally in these cases the water is dirty, discoloured, occasionally stained with blood, and offensive. The most common cause I have found to be the retention of a portion of placenta or of clots in the uterus; but a polypus may produce like results. The watery discharges alternate, but not always, with discharges of blood. The fluid may, under certain conditions, collect in considerable quantity in the uterus, so that the organ becomes greatly distended before the collection is expelled in a gush.

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* "Jenaische Zeitschrift," 1865.

Sometimes watery fluid is mingled with air, constituting *physo-hydrometra*. This is also a puerperal or post-puerperal condition, and is commonly the result of retention of some portion of placenta or membranes, and the admission of air into the uterine cavity. If an examination is made when the uterus is relaxed after labour, especially if the hand be introduced into the uterus, the vaginal walls are separated from their usual contact, and a channel is formed along which air easily enters Merely turning on the side, or a little more prone, will often, by favouring the fall of the uterus forwards, produce a vacuum into which air will rush. This is one reason amongst others why I am unable to approve of the abolition of the old-fashioned binder, which some people would condemn, for no better reason that I can see than because it is old-fashioned. After labour, especially in pluriparæ, the abdominal walls are so relaxed that they can give no support to the uterus. The binder does temporary duty for the inert abdominal walls. The history of physo-hydrometra is, I believe, this: a portion of placenta, membranes, or clots, remains in the cavity of the uterus after labour; some air gets in as I have described; decomposition ensues, and the gases of putrefaction are added to the air from without, whilst the os uteri is occluded by the placenta or blood-mass falling over it. When this occurs, there is invariably hectic or irritative fever; peritonitis and septicæmia commonly attend; great abdominal pain. The enlarged, distended uterus can be mapped out rising as high as, or higher than, the umbilicus; and resonance is made out on percussion.

One condition, the result of impregnation, often leads to copious and repeated discharges of watery fluid: the *hydatidiform degeneration of the chorion*. In this case the ordinary signs of pregnancy may not be present, and even the patient herself may not think she is pregnant. There is, however, always evidence of enlargement of the uterus, and generally great pelvic distress. The water escapes in gushes at uncertain times; it is often tinged with blood, resembling red-currant water; it has not the offensive odour belonging to the watery discharges of cancer; sometimes, but not often until late in the progress of the case, cysts will be found swimming in the water; it is generally expelled with painful uterine contractions. In a case I saw at St. Thomas's Hospital, the nature of the disease was not at first suspected. There was some abdominal enlargement, retention of urine requiring the catheter, and most distressing pelvic pain with irritative fever. The os uteri was found high up above the symphysis pubis, whilst behind it the pelvic cavity was filled with a large, rounded, firm mass, taken to be either the retroverted gravid womb or a fibroid tumour. One day a large quantity of water, blood, and a mass of chorion-cysts were expelled. We had, in fact, the condition of retroverted gravid womb complicated with hydatidiform or cystic degeneration of the chorion. I have since seen a similar case at St. George's.

Apart from pregnancy, watery discharges are sometimes of grave significance. During and after the climacteric period, the most frequent cause is some form of malignant disease, especially the so-called cauliflower excrescence of the uterus. In this case other symptoms will probably point to the seat and nature of the disease. The fluid discharged is seldom clear; it is generally turbid, dirty, often tinged with blood, resembling water in which flesh has been macerated; it contains shreds or flocculi of solid matter, the proceeds of superficial erosion or necrosis of the surface of the diseased growth, and is almost always of a peculiar offensive odour. It often alternates with hæmorrhage. Local exploration will place the nature of the case beyond doubt. Another form of malignant disease giving rise to watery discharges is the "oozing excrescence of the labia."

But we must remember that similar discharges may take place from polypus or inversion of the uterus. Hence we have another example of the wisdom of not pronouncing a diagnosis until we have made an internal examination. Water may escape in large quantity from the rupture or perforation of an ovarian cyst in the vagina. In such a case, the rapid concurrent diminution of the abdominal tumour will lead to the right conclusion.

I have seen profuse watery discharge from the uterus and its neck in cases of retroversion and retroflexion of the uterus. Here we may infer that their glandular system was unusually active, and that the vascular fulness was increased by the imperfect return of the blood by the veins, compressed or strangled by the malposition or distortion of the uterus. Certain it is that in one very marked case profuse watery discharge ceased with the restoration of the uterus to its normal position.

Watery discharge may be urine escaping from a vesico-vaginal fistula. The character of the fluid and other circumstances seldom fail to establish the exact nature of the case.

Under certain conditions of the mucous membrane of the uterus, more especially of the cervix, copious secretion of watery fluid may take place rapidly. I believe this chiefly occurs when the mucous membrane is hypertrophied. In this case the numerous glands are probably also hypertrophied, and acquire a greatly-increased activity. It will be remembered that all the mucous membranes at times discharge large quantities of watery fluid. Thus the mouth is the seat of ptyalism, the stomach of pyrosis, the intestinal canal of diarrhœa. It is rational to infer that causes analogous to those which induce watery secretion from the mucous membranes in these organs, may induce the like event in the mucous membrane of the genital tract.

DISCHARGES OF AIR.

Air may get into the vagina, if not into the uterus, in the non-pregnant state. In the normal condition the walls of the vagina are maintained in perfect contact, and no air, or probably very little, is admitted. But when the parts are greatly relaxed, the vulva open as when the perineum is torn, the lower part of the vagina is no doubt exposed to the contact of air, but the very condition of patency prevents the retention of the air to such a degree as to lead to its escape in perceptible volume. Air also penetrates where too large a pessary is worn, which keeps the vaginal walls apart. But under peculiar circumstances air enters in large quantity, to be expelled with noise. Dr. George Harley details* a curious case, in which he carried out decisive experiments, to prove the correctness of the diagnosis. A pluripara frequently expelled air from the vagina with a loud noise. It was ascertained that no connection existed between the rectum and vagina. Dr. Harley took a full-sized male catheter, to which was attached a long india-rubber tube with a stopcock at the other end. The catheter was introduced into the uterus, the end of the tube with the stopcock being placed in a tumblerful of water. No air escaped when the instrument was in this position; but, on placing the open end of the catheter in the vagina, an instantaneous discharge of gas took place. The water was found to be sucked up through the tube into the vagina. It was found that the vagina sucked in and expelled the air by spasmodic action. It was further observed that the abdominal muscles assisted in the suction-process. The uterus was completely retroverted. This displacement being remedied, and the health improved by tonics, a cure ensued. Dr. M'Clintock says:† "Two or three women who had prolapse of the womb have told me that soon after getting up in the morning they have been conscious of the escape of air from the vagina. The vagina was enlarged, the lower part of the uterus hypertrophied. There was no fistula; the air came from without."

If we observe the vagina when the duck-bill speculum is applied, the movements of rise and fall under the influence of the rise and fall of the diaphragm are seen. Dr. Adolph Rasch has investigated* these phenomena with great care. He says, if a multipara, whose genitals are normal, be placed on her back, with the thighs flexed and abducted, and the vaginal orifice closed, movements caused by respiration are seen, but no air enters. In the lateral position the same thing is observed even if the vagina is lax, and even when the perineum is ruptured. When the patient is placed in the prone position, or on all-fours, if the vulva be open, air will enter, because the intestines falling downwards by gravity causes a vacuum. Under this condition violent exertion may expel air, giving rise to vaginal flatus. If the abdomen be supported by the hands or a bandage, no air enters.

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* "Obstetrical Transactions," 1863.

† "Diseases of Women," p. 54.

There are several interesting applications of this knowledge. It teaches that the best position after labour, if not during labour also, is the dorsal decubitus ; that the same position is also best in the case of pelvic abscess or hæmatocele discharging into the vagina; and that we must carefully consider this respiratory rise and fall of the vagina when selecting pessaries. It is by turning to account this action that we derive the greatest advantage from the spoon or Sims' speculum. The blade drawing the perineum well back, whilst the semi-prone position of the patient favours the falling forwards of the abdominal viscera, air fills the vagina, counteracts the effect of inspiration, and thus enables us to get a good view of the os uteri. The same position also greatly aids our efforts at reducing inversion of the uterus, and in replacing a prolapsed umbilical cord. On the other hand, in most operations upon the uterus and vagina, where it is of importance to bring the uterus as low down near the vulva as possible, the dorsal position, by bringing the force of gravity to counteract the respiratory rise of the uterus, and which can further be greatly aided by direct pressure by an assistant's hand above the symphysis pubis, is the best.

THE PURULENT DISCHARGES.

Some purulent-looking discharges are in reality mucous, the appearance being due to epithelium-cells, not to pus-globules. When pus-globules in large proportion are found, they indicate generally a breach of continuity of the mucous surface—that is, a granulating or ulcerated surface. When pus escapes in quantities, suddenly at intervals, and sometimes by continuous draining, the source probably is an abscess whose seat is outside the uterus or vagina, as in what is called pelvic cellulitis, opening into the vagina. In such a case examination by touch internally, and externally in the iliac regions, will reveal the extra-uterine disease. The uterus will be felt set fast by surrounding firm plastic effusion. The os uteri will generally be found in the centre of the pelvis, low down, or inclined to one side, if the pelvic peritonitis is chiefly unilateral. This position of the os uteri distinguishes pelvic peritonitis from retro-uterine hæmatocele, which pushes the os uteri forwards close behind, and sometimes above, the symphysis pubis, and which may also be attended by suppuration.

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* "Obstetrical Transactions," 1870.

A suppurating ovarian cyst may contract adhesion with the roof of the vagina, and form a fistulous perforation through which pus may escape.

I have had under my care a case in which pus is voided by the vagina, the origin of which is an abscess in the left hypochondriac region opening into the intestine, and which at a lower part has formed a fistulous communication with the vagina.

The glands of the cervix or of the vulva, especially the vulvo-vaginal gland, when inflamed, as from gonorrhœa, discharge pus freely. Abscesses may form in the connective tissue between the uterine neck and bladder, or at any lower part of the vagina, or in the loose tissue of the labia vulvæ: and, bursting, will give a purulent discharge.

To distinguish some apparently purulent discharges from mucous, appeal to the microscope is necessary. The distinction is important, because it is generally true that the unbroken mucous membrane of the genital tract does not yield pus. When true pus appears, it is therefore mostly an indication of erosion, ulceration, or abscess. As Virchow has pointed out, all mucous membranes with cylinder-epithelium are little disposed to form pus. The matter which is produced is found, on accurate examination, to be only epithelium, though it may, to the naked eye, have a thoroughly purulent appearance. The intestinal mucous membrane rarely produces pus without ulceration. The mucous membrane of the uterine tubes, which is often covered with a thick mass of entirely puriform appearance, shows almost always only epithelial elements.

On other mucous membranes—the urethra, for example—we observe copious discharges of pus without the least ulceration.

We thus see how numerous and strange are the sources of pus in the vagina, and that a purulent discharge is no sure evidence of disease of the uterus or vagina. Exploration must extend beyond these organs.

THE SIGNIFICANCE OF HÆMORRHAGIC DISCHARGES.

Discharges of blood from mucous membranes are not necessarily significant of local disease. For example, epistaxis from the Schneiderian membrane is not infrequent in childhood and old age, unconnected with organic disease anywhere. Although when it has once set in, the bleeding may go on to an excessive, to an alarming, and sometimes even to a fatal extent, it seems in the first instance to be determined, by an effort of the vascular system, to unburthen itself of a superfluous accumulation. It appears to be critical, and in many cases to be beneficial. During the period of sexual life the uterine mucous membrane is the outlet towards which any overflow is directed; during this period Schneiderian epistaxis or other forms of hæmorrhage are rare; the seat of election for critical and other hæmorrhages is the uterus. And it is remarkable that, as a result probably of the disposition which the uterus had acquired of acting as a periodical evacuant, long after the cessation of menstruation proper, it still continues to be the safety-valve by which vascular repletion or tension is relieved.

The aptitude of the uterus to serve in this way is occasionally manifested also at an early age; that is, just before, or about the institution of the menstrual function. Young girls sometimes begin with a copious flooding, which does not appear to be distinctly determined by ovulation.

In the cases referred to, hæmorrhage even copious does not necessarily imply disease, at least not disease of the ovaries or uterus. It is an expression of constitutional or general vascular tension. Still hæmorrhage from the uterus, especially if prolonged or repeated, is so commonly a consequence of disease of that organ, that it ought, as a general rule, to be taken as a warning to make local examination. This is the more imperative, because in many cases this examination leads at once to the detection of a cause which can be quickly removed; and in almost all cases the surest way of stopping dangerous hæmorrhage is by topical applications.

This tendency of the vascular system to seek its outlet by the uterus is fortunate. If a vent were not found here, the risk of internal effusions would be enormously increased. And not even excepting the Schneiderian membrane, the uterine mucous membrane is the most under control.

Climacteric uterine hæmorrhage may avert an attack of apoplexy. The outlet of blood from the uterus may avert effusion from the ovary or its plexuses into the peritoneum. In this way Nature often proves herself a better physician than the modern practitioner who has abandoned the use of the lancet.

It may be stated, as a general proposition, that whatever produces hyperæmia predisposes to hæmorrhage. Thus inflammation takes high rank as a cause of hæmorrhage. Inflammation involves a *vis à fronte,* attracting blood to a part, and so filling the capillaries that they may burst.

As in other parts of the body, hæmorrhage from the uterus may be *active* or *passive.* In active hæmorrhage rupture of vessels arises from the attraction of an inordinate quantity of blood into them. In passive hæmorrhage the escape arises not simply from distension from excess of blood, but generally also from the depraved quality of the blood, from the ill-nourished, weakened condition of the coats of the vessels, and the impeded return of the venous blood. In a woman who had suffered much from metrorrhagia, the blood contained only 2 parts in 1,000 of globules, 1·8 of fibrin, 61 of solid materials of serum, and 915 of water.

Hæmorrhage from the uterus is sometimes called *menorrhagia,* sometimes *metrorrhagia,* sometimes *flooding.*

The term menorrhagia implies an excessive flow of the menstrual discharge. Although in fact the menstrual nisus or ovulation exerts a powerful initiative and aggravating influence in the production of hæmorrhage, yet there often exists in association with apparent menorrhagia some local disease which is more strictly the cause. That is, without this local disease the ovarian stimulus would produce no more than the ordinary menstrual flow. But a mucous membrane once set bleeding easily goes on pouring off blood. It may be likened, and indeed often is so by patients, to the turning on of a tap. The vessels of the mucous membrane, whether they have burst or not, pour off blood with the greatest readiness; and the stream being once directed to a given part which affords ready outlet, a derivative action towards this part is easily kept up.

Metrorrhagia means very much the same thing as flooding. It is used to express a copious flow of blood not obviously associated with menstruation. Uterine hæmorrhage is another synonym. As a general term it is free from the objection which applies to "menorrhagia," as it expresses simply a fact independently of all theory of causation.

In almost every case of uterine disease leading to hæmorrhage, periodicity more or less regular is observed. There are commonly intervals of remission or cessation. Women observe that their courses last for two or three weeks at a time, leaving only one or two weeks of freedom. The explanation is found in the periodical increase of vascular and nervous tension attending ovulation and the menstrual nisus. This periodicity is often preserved long after the natural menopause, when any disease, as cancer or tumour, continues to be the cause of hæmorrhage. In the same way as patients of tuberculous diathesis are eager to persuade themselves that occasional hæmoptysis is due to accidental insignificant causes, so women in whom losses of blood, more or less periodical, continue or recur long after the menopause, are ready to believe that these losses are natural or exaggerated menstrual discharges, and that they may be taken as evidence of protracted sexual life.

To determine what losses must be ascribed to natural menstruation and what to pathological causes, we must seek to define the characters of natural menstruation. Any marked departure from these characters must then be made the subject of closer investigation, in order to separate or analyze the often combined physiological and pathological factors.

The history of menstruation will be studied more methodically hereafter. It will be enough to state here the leading features of healthy uncomplicated menstruation. *Fluid* blood, somewhat glutinous, is discharged gradually, to the amount of two to four or six ounces, over a period of two, three, or four days, at regular intervals of twenty-eight days, or nearly so, beginning at the age of twelve, thirteen, or fourteen, and lasting until forty-five or forty-eight.

There is a range of variation in all these characters, depending in some cases upon individual peculiarities. For this allowance must be made. But it is a safe and prudent clinical rule to suspect that any wide departure from these characters depends upon some pathological complication. Taking the characters of normal menstruation as our standard, we shall be justified in concluding that discharges of coagulated blood, discharges habitually exceeding four or six ounces, discharges continued for a week or more, leaving intervals of freedom shortened to three weeks or less, discharges occurring during the proper intervals between the periods, and discharges occurring long after the age of forty-five or forty-eight, especially if excessive or irregular as to periodicity, are of pathological significance. The same thing may be said of hæmorrhagic discharges recurring in women after the menopause; that is, after a complete cessation of the ordinary menstrual flow for a year or more. It may be assumed, as a physiological fact, that the function of ovulation is not resumed after having been suspended at its natural term. The ovary has then undergone a process of involution or atrophy which is incompatible with the development of ova. Discharges of blood, then, after the menopause depend upon other causes than normal ovarian stimulus. The circumstances under which hæmorrhage appears will occasionally declare its character. For example, hæmorrhage may immediately follow some accident, as sudden exertion, or coitus.

In addition to the general or average standard deduced from the study of the natural history of menstruation, we shall often draw the most trustworthy conclusions from the particular study of the individual patient. She herself must often furnish her own standard of comparison. Any marked change from the habitual characters of the menstrual function will point to the necessity of inquiring into the cause.

Hæmorrhages may generally be considered abnormal which are irregular in their appearance, or excessive in duration or quantity, or which obviously tell upon the system by inducing anæmia or debility. Another test of abnormality will often be found in the association of other symptoms with the hæmorrhage.

Abnormal hæmorrhage is not always marked by excessive quantity. Blood may appear in streaks or small quantities mixed with the mucus of leucorrhœa. This will often be connected with breach of surface of the mucous membrane, as abrasion or ulceration; often, however, with simple congestion or inflammation. Apart from pregnancy, a copious flow of blood will generally depend upon some organic alteration in the structure of the uterus, as hypertrophy of the body or cervix, the growth of tumours or polypi, or malignant disease.

If copious hæmorrhages occur in a woman past the child-bearing age, the probability is great that the cause is malignant disease; and this probability rises if the cessation or diminution of the blood-flow is followed by a watery discharge stained with blood, offensive in odour, and showing *débris* of tissue in the form of shreds. It must be remembered, however, that the discharges attendant upon polypus and inversion of the uterus may present very similar characters. Many cases of polypus have been seen in which the history, subjective symptoms, and discharges so nearly resembled those of malignant disease that opinions were strong in favour of this view until corrected by examination. And in this connection we must not forget that copious hæmorrhages occasionally occur in aged women in whom no disease whatever can be detected. These hæmorrhages are similar in their significance to the Schneiderian epistaxis of the aged. If not excessive, they may even be beneficial.

A clinical test of some value may be found in the following facts. Immediately preceding and following ordinary menstruation some amount of leucorrhœa is not uncommon; but during the intermenstrual times there is no discharge of any kind when there is no local disease. When, therefore, the hæmorrhage is not great—and the rule will apply with especial force in young and single women—examination may be postponed. On the other hand, whenever there is continuous discharge, hæmorrhagic or leucorrhœal, the probability is great that there is local disease, and the indication for local examination is more distinct.

A discharge of pure bright blood occurring suddenly after intercourse or exertion is presumptive of early malignant disease. In polypus the hæmorrhage is usually followed by mucous or watery discharges.

Abortion or labour at term is not seldom followed by hæmorrhages more or less continuous or intermittent for many weeks or even months ; so long, indeed, that their dependence upon the puerperal changes may be lost sight of.

Uterine hæmorrhages may be classified as follows :—

A. Hæmorrhages escaping externally, *without alteration of the structure of the uterus*, as—

1. From primordial disease of the heart, liver, or lungs.
2. Exaggerations of the menstrual function, as in plethoric girls at the onset of menstrual life, and in women at the menopause.
3. Throughout menstrual life, or beginning towards its close, from abdominal or hepatic congestion or obstruction. In some, hæmorrhagic menstruation seems hereditary.
4. From emotion or physical shock.
5. Complementary of hæmorrhages suppressed elsewhere.
6. From sudden suppression of the action of the skin.
7. From ovarian or mammary excitation. Excess of coitus, especially if at menstrual epoch.
8. The climacteric and senile hæmorrhages.
9. From blood-disease ; as variola, scarlatina, typhoid, acute atrophy of the liver, leucocythemia, scurvy.

In this class we see that the cause of hæmorrhage may be distant from the uterus. Hypertrophy of the heart is a not uncommon cause of uterine hæmorrhage, especially in pregnancy and childbed. The hypertrophy may be the result of antecedent disease, or of pregnancy. This is one cause why the risk of hæmorrhage increases with the number of pregnancies. There is an increasing difficulty in the process of involution of the heart, and an increasing disposition to fall into fatty degeneration. A feeble, fatty heart also I have observed disposes to uterine hæmorrhage. Imperfect involution of the uterus is common in the subjects of fatty heart.

Liver disease may act simply, or as complicating heart-disease. It acts especially in women past forty, during the climacteric, and in those who indulge in drink.

Lung-diseases, especially those marked by dyspnœa and hyperæmia or œdema, dispose to uterine congestion and hæmorrhage.

Uterine hæmorrhage is sometimes observed in phthisis, although more commonly this disease induces amenorrhœa.

It is not always safe or judicious to stop hæmorrhage depending upon remote obstructions to the circulation hastily or completely. There can be no doubt that they act as useful evacuants and derivatives regulating tension.

Menorrhagia has occasionally proved fatal at the onset of the menstrual function in girls. The late Mr. Obré related the case of a virgin, aged fourteen years and three months, in whom the first menstruation set in violently, and could not be checked. Everything was found healthy, except the uterine mucous membrane, which was softened and ecchymosed, and in some places detached from the muscular coat. This alteration was probably nothing more than the menstrual decidua infiltrated with blood.

I saw, with Mr. Hodgson, of Brighton, a girl of fourteen to fifteen, who on several occasions lost blood so profusely under the sole influence of menstruation that her life was barely saved. Once the flooding was arrested after dilating the cervix and injecting perchloride of iron. All other remedies seemed ineffectual.

B. *The hæmorrhages of pregnancy.*

1. Abortion.
2. Detachment of placenta.
3. Extra-uterine gestation.
4. Retained placenta or clots,—placental or fibrinous polypus.
5. Hydatidiform placenta.
6. Varix of the vulva or vagina.

It must be borne in mind that in many cases of hæmorrhage in pregnant women the blood does not come from the cavity of the uterus, but from the cervix uteri, which may be abraded and hypertrophied. The hyperæmia and the great tension of the vascular system of pregnancy easily issue in hæmorrhage where the mucous surface is unsound.

Many of the conditions, with or without alteration of structure, which occur in non-pregnant women may occur also in the pregnant; and pregnancy may even increase the disposition to hæmorrhage.

C. *Hæmorrhages with alteration of structure.*

1. Metritis proper.
2. Inflammation of the cervix uteri.
3. Engorgement of the body and cervix induced by stenosis or displacement or distortion of the uterus or other causes.
4. Hypertrophy of the cervix or of the body of the uterus, especially of the mucous membrane, as from syphilis.
5. Fungous granulations of the os, abrasions, ulcerations, especially if there is syphilitic complication.
6. Fibroid tumours.
7. Polypi of the uterine cavity, cervix, or os, or of the vagina.
8. Cancer or sarcoma in the non-ulcerated state, and in the ulcerated state.

9. Wounds of the uterus, vagina, or vulva from accident, operations, leech-bites, abrasion or irritation as from ill-selected pessaries.
10. Voiding the blood of thrombi or of retro-uterine hæmatoceles.
11. Varicosity of the vessels of the labia, which may burst.
12. Imperfect involution of the uterus and obstruction of circulation kept up by impeded mobility from peri-uterine effusions.
13. Hyperæmia induced by the uterus being within the range of any abnormal vascular activity, as an extra-uterine gestation-cyst.

Hæmaturia, or disease of the meatus urinarius, may possibly be mistaken for hæmorrhage of uterine origin. And, on the other hand, it is necessary to bear in mind that apparent hæmaturia may be due to uterine disease. Thus I have known urine which escaped by a fistula, the result of cancerous erosion, be retained for a time in the vagina, and being discharged mixed with blood, taken for hæmaturia, the result of bladder or kidney disease.

D. *Hæmorrhages poured out internally*—

1. Retro-uterine hæmatocele, from blood from ovary, ovarian plexuses, or Fallopian tubes, under menstrual nisus.
2. Peri-uterine hæmatocele or thrombus, or effusion into the connections of the broad ligaments, or between the bladder and cervix uteri.

Similar events may happen from abnormal ovarian congestions; from rupture of ovarian tumours, or of vessels in their walls; from rupture of varices of the ovary or broad ligaments.

Under ovarian menstrual stimulus blood may be poured out into the abdominal cavity, because there is some obstruction in the course of the genital canal.

3. The Fallopian tubes may be occluded; there may be stenosis or atresia of the uterus, vagina or vulva; there may be retroflexion of the uterus.

In these cases blood may accumulate above the seat of the obstruction, and regurgitate into the abdomen.

4. There may also be retrograde hæmorrhage from abortion.
5. Abdominal hæmorrhage may arise from rupture of the sac of an extra-uterine gestation. External hæmorrhage commonly precedes or attends the rupture and the internal effusion.
6. The gravid uterus may rupture, with or without violence, after the fourth month. This is more likely to happen when the gestation is mural, or in one horn of a two-horned uterus. In these cases there will probably be some external hæmorrhage also.

Lastly. Hæmorrhage may take place in the abdominal cavity from various sources not connected with the genital organs or functions.

A methodical analysis of the various causes of uterine hæmorrhage for diagnostic purposes would carry us through almost the entire field of ovarian and uterine pathology. The morbid conditions which are attended by hæmorrhage will be described in their proper places. We can only now enumerate the conditions, physiological or pathological, which are associated with hæmorrhage ; and seek to lay down compendious principles of diagnosis and treatment.

In practice we are continually called upon to treat symptoms or consequences of disease. It is the merest folly, or affectation of science in many cases, to pretend to remove a disease by at once attacking the presumed cause. The folly is often as great to postpone treatment until we have discovered the cause. In no case is this pretension more absurd or more dangerous than in that of hæmorrhage from a mucous membrane. Whilst we are waiting to discover the cause, the patient may bleed to death. If we apply ourselves at once to stop the hæmorrhage, we may save her, and so gain the opportunity of attacking the cause.

Treatment.—The first practical rule to observe when in presence of a profuse flooding is to take off the pressure of gravitation, by placing the patient in a horizontal posture with the pelvis somewhat elevated; to remove all articles of dress which, by their pressure upon the chest or waist, impede the circulation; to remove, as far as possible, all sources of excitement or emotion ; above all, *to obtain absolute rest.* Wounds or injuries which would be of no consequence if the patient remained perfectly quiet and recumbent, may, so rich is the vascularity and so free the intercommunication of the vessels of the pelvis, lead to fatal hæmorrhage, if she assume the erect posture, or undertake any bodily exertion.

The next practical rule is to endeavour to stop the bleeding as quickly as possible, without waiting to inquire into its cause. This can rarely be done effectually or certainly without the application of topical remedies. This necessarily implies a preliminary examination by the finger, hand, or speculum. We thus obtain incidentally useful, often adequate, diagnostic information. For example, we find a polypoid tumour or a wound. The hæmorrhage may then be stopped by treatment *ad hoc.* We may find malignant disease ; and then all we can do is to stop the bleeding by the application of powerful astringents or cauteries, as the perchloride of iron, chromic acid, nitric acid, or the actual cautery. We may find a fibroid of the uterus ; and the hæmorrhage may be controlled by the same remedies, postponing treatment adapted to prevent the recurrence of bleeding to a more favourable opportunity.

We may find an ovum presenting at the os uteri, or some other form of hæmorrhage connected with pregnancy. The treatment of these forms cannot be discussed in this work. I have described them carefully in my *Lectures on Obstetric Operations.*

Where we find no cause that admits of immediate removal, we may still arrest the hæmorrhage. The method which is commonly the readiest, because it requires no special appliances, is plugging the vagina. Whilst waiting for these special appliances, it may be desirable to plug. This is done by pushing pieces of lint, linen, sponge, or silk handkerchiefs into the vagina. First of all, it is desirable to remove clots by the hand, and to wash out the vagina with cold water. Then holding the labia apart with the expanded fingers of one hand, the plugging materials lubricated in oil, or better with oil containing an eighth or tenth part of carbolic acid, or lard, are pushed in gradually by the fingers of the other hand, or by aid of the uterine sound, the handle of a tooth-brush, or any other accessible instrument. The plugging must be firm, packing the vagina pretty tightly. It is, however, generally preferable to plug by the aid of a speculum. The pieces are thus accurately packed, and the speculum is gradually withdrawn. In this way uterine and vaginal hæmorrhage may frequently be checked for a while, and time be gained for choice of more scientific remedies. But plugging is not free from objections. In the first place, if the case be one of malignant disease, tight packing of the vagina is apt to break down the fragile malignant tissue, to increase the bleeding, and favour ulceration. In the next place, after a while the elastic and contractile vagina compresses the plug saturated with blood, which coagulating forms a compact ball which no longer fills the canal; blood then easily flows past; or being retained concealed, may give rise to a false security, and lead us to defer more effectual remedies. In the third place, plugs, by heating and distending the parts, are a source of irritation and distress; they often in this way seem even to keep up hæmorrhage. In the fourth place, if retained a few hours, the plugs, or the retained blood, decompose and become exceedingly foul. Fifthly, the compression of the urethra, or the metastatic irritation, often causes retention of urine. And even if the plug have arrested the hæmorrhage, this often breaks out again when the plug is removed.

In the majority of cases, therefore, it is wise to look upon plugging as a mere temporary expedient, to be adopted whilst preparing for more trustworthy means.

I could give no rule of more general application or more valuable than this:—*In all cases of hæmorrhage coming from the body of the uterus obtain and maintain free patency of the cervical canal.*

In cases of abortion, of the hæmorrhages of gestation, of intra-uterine polypi, or fibroids, of hypertrophy of the mucous membrane, of malignant disease of the interior of the uterus, to obtain free external escape for the hæmorrhage and free access to the source, in order to control the bleeding, is the first necessity. We might, it is true, in almost every case introduce a catheter or tube to carry a styptic injection into the uterus. But this proceeding, invaluable if properly carried out, may be useless or even dangerous if resorted to whilst the cervix uteri is contracted. Blood retained in the cavity of the uterus forms clots which, under the spasmodic contractions they excite, become compressed into firm masses of fibrin by the squeezing out of the serum. These coagula cannot make their way through the constricted cervical canal; they may even become closely adherent to the walls of the uterus, forming the "fibrinous polypi." Their presence in any form is a source of irritation and suffering: by causing alternate contraction and dilatation of the uterus they keep up hæmorrhage; and, occupying the uterus, injections thrown into the cavity are lost upon the clots instead of constringing the bleeding surface. Moreover, as I shall show hereafter, wherever there has long existed a narrowing of the cervical canal, there will be produced a dilatation of the genital tract above the stenosis. Hence, there will be serious danger of injected fluids being driven along the dilated Fallopian tubes into the abdominal cavity. As a consequence of the same condition, there is also serious danger of the blood which gathers in the uterine cavity and tubes being driven in a retrograde course into the peritoneum. This is one way in which retro-uterine hæmatocele is produced. It is the way which may most successfully be guarded by securing a free outlet by the cervical canal and vagina.

In the case of retained ova, membranes or placenta, or clots, the first indication is usually to remove these. To do this it is often necessary to pass in one or two fingers to break them up and to bring them away. In the case of intra-uterine polypi, there must be room to introduce an instrument, as well as a guiding finger. In the case of an unhealthy condition of the uterine mucous membrane, free passage is wanted for the application of hæmostatics. These are, I believe, most useful if applied in a tolerably concentrated form. To do this, it is preferable to introduce them soaked in cotton wool twisted on a roughened platinum probe. If a swab cannot be introduced, and it may be difficult to do it, unless the cervix be widely open, because the charged swab as it touches the cervix in its passage contracts the canal, it is then necessary to resort to injection, or the introduction of styptics in the solid form. The best way of applying styptics I have found to be by inserting small bits of sponge in a tube made on the model of my uterine ointment-positor, and saturating this with the styptic. The end of the tube is then carried into the cavity of the uterus, when by pressing upon the piston, the fluid is squeezed out in drops upon the lining membrane of the uterus. If this plan be inefficient, we must then inject a larger quantity through the tube by help of a syringe.

If any further reason were wanted to recommend the preliminary dilatation of the cervix uteri, it would be this: It is in many cases enough to arrest the bleeding. And, if not of itself successful, it at any rate opens the road by which we can pursue a treatment that will succeed.

What are the means of dilating the cervix? These are various, and the choice will depend upon the nature of the case. If it be one of abortion, of intra-uterine polypus or tumour, or of morbid condition of the mucous membrane, it will generally be easy to place one or more laminaria-tents or sponge-tents, which in the course of a few hours will effect the desired dilatation, and, whilst acting, will probably check the bleeding. If the case be metrorrhagia from fibroid tumour, or menstruation obstructed by stenosis of the os externum uteri, it may be necessary to dilate the part by incision. This operation will frequently not only prepare the way for relief from the immediate danger, but it is an essential condition of prevention in the future.

When we have stopped or moderated the bleeding, our next inquiry will be, how we are to prevent its recurrence? This will lead to the study of the causes immediate and remote of the hæmorrhage, and of the means of alleviating or removing those causes. I cannot in this place further anticipate the history of the conditions associated with hæmorrhage. They will be systematically discussed under their appropriate heads.

Active hœmorrhage is characterized by increased vascular tension, by rapid determination of blood to the pelvic organs, by heat, throbbing, perhaps pruritus, pain, sense of fulness or weight, and bearing down of the uterus. If examination be made by touch the vagina is felt hot; perhaps the vaginal pulse is perceived; there is increased softness of the vaginal portion; and tenderness of the uterus when pressure is made upon its walls through the vaginal roof. The general system evinces the perturbation caused by the local molimen. There is a state of febrility, of vertigo, of swimming of the eyes, the eyes are suffused, and nervous symptoms of an hysterical kind are frequent.

Passive hœmorrhage is not marked by the signs of fluxion or active determination. There is not the same local hyperæmia as in the active form; and it is not preceded by the same heat, vascular tension, or attended by the vaginal pulsation. Having once occurred, passive hæmorrhage tends to establish itself by degrading the quality of the blood, and by altering the tissues, impairing their tonicity, and rendering them more easily permeable. The blood discharged often becomes more serous in character. It is in this form that arsenic, strychnine, and iron are especially serviceable.

The mode of dealing with hæmorrhage is often too empirical. There are four principles that give a rational basis of treatment, and which may, in most cases, help to guide our proceedings.

1. Bearing in mind the great physiological factor that is almost always in play in the hæmorrhages of women, namely, the general vascular tension, the increased action and irritability of the heart, associated with increased nervous tension, and the special determination of blood to the pelvic organs excited by ovulation, we must adjust measures to moderate this peculiar excitement. This is the principle that is most commonly neglected. The most useful agents in this connection are: digitalis, aconite. bromide of ammonium or potassium, sometimes opium, ipecacuanha, chloral, salines, as acetate of ammonia, nitrate of potash. Cold or a reduced temperature will often be useful.

In this association the avoidance of emotion is of great importance. The influence of emotion in turning the blood-tide to the uterus is most remarkable. And when with this unusual afflux the nerve-force is diverted, used-up in other ways, the vessels having lost their restraining power easily give way; the flood-gates are opened.

The reflex or diastaltic function, which is invoked with such pre-eminent effect in the floodings which attend parturition, must not be lost sight of in the hæmorrhage of the non-pregnant. The local application of cold by means of ice or cold-water is often useful. Ice in the vagina, or cold-water injections, should generally be tried before we resort to local styptics. Cold may be applied to the spine. But the too common way of applying ice and cold-water to the abdomen or vulva is open to serious objections. It is rarely efficacious. It is apt to depress the system. It often lays the foundation of perimetritis or other inflammations. Emmet extols hot water injections.

2. The undue current or tide setting in towards the pelvic organs may be further controlled by agents that effect a diversion or attraction to other parts. Of these perhaps the most effectual is one hardly likely to be often revived. It is the small bleeding from the arm. Cupping from the nucha or loins might answer the purpose. Ligatures round the limbs, the object of which is to retain a portion of the circulating fluid in the extremities, have been used. I should not be disposed to trust to this method for more than a momentary purpose. Position is important. We may call gravity to our aid instead of letting it work against us, by keeping the pelvis at a higher level than the rest of the body. Amongst the most useful revulsive measures is purgation. Saline purgatives especially, by diminishing the

volume of the circulating mass, and by lowering the heart's action, operate with great advantage.

3. Certain agents taken internally appear to possess a special power, by modifying the constitution of the blood, or by constringing the coats of the vessels, or by promoting contraction of the uterine muscular fibre, in checking the escape of blood. Of these the most useful are turpentine, which may be swallowed in capsules; ergot, which may be given in the form of fluid extract or powder, or injected under the skin, or ergotine; tincture of hamamelys, in five or ten drop doses every three or four hours; cinchona or quinia, strychnia or nux vomica, sulphuric or phosphoric acid, tannic or gallic acid, acetate of lead, the Vinca major, Indian hemp, ipecacuanha.

Various combinations of these often answer better than any one in the simple form.

4. To secure the equilibrium of the circulatory apparatus, care should be taken to put the stomach, liver, and kidneys in the best working order. For this purpose alteratives, aperients, and salines are often essential; and where there is any gouty tendency, indicated by lithiasis, "rheumatic pains," or arthritic swellings, lithia and colchicum will be useful. And where there is no imperative contra-indication, exercise in the open air will be an effective adjuvant to, or substitute for, the Materia Medica.

But all these means may fail; or before they have time to act the patient's condition may be desperate. We must then rely upon local styptics. The bleeding area must be staunched by direct action. Of these the best are: perchloride or persulphate of iron, nitric acid, styptic colloid, iodine; the actual cautery, the most convenient mode of supplying which is by the galvanic battery, or by Paquelin's thermo-cautery.

After-treatment.—Hæmorrhage, especially the active form, is followed by a stage of reaction, of erethism, which has been, not inaptly, called hæmorrhagic fever. The pulse is quickened, the skin is warm and dry, there is intense beating headache, restlessness, hyperæsthesia manifested in general irritability, and morbid sensitiveness to light and sound. In this condition it is a serious clinical error to administer iron. It may be theoretically true that the vascular system wants iron; but the effect of giving it is to add fuel to the fever and excitement, to parch the tongue and mucous membranes generally, to check secretions, to increase headache and restlessness, to disturb digestion and nutrition. The system may want iron, but it wants saline solutions more; and it wants these first. Saline solutions serve better than anything else to replenish the exhausted circulating fluid. The vessels seem to crave in the first instance for a sufficient volume of fluid as a necessary condition for the efficient dynamic action of the circulating apparatus. It is a fact determined by the observations of Dr. Little and Mr. L. S.

Little on cholera patients, that the injection of saline solutions of about the specific gravity of the blood will revive persons on the point of sinking. I can affirm, from large experience, that the exhibition of salines after hæmorrhages is followed by the best effects. They exert a marked influence in subduing vascular excitement; they allay the fever, calm nervous irritability, improve the secretions, and prepare the way for iron and other tonics, which at a later stage find useful application. The best form of saline is the acetate of ammonia, freshly prepared. To this may usefully be added a sedative, as Battley's solution, and sometimes digitalis or aconite. At a later stage, hamamelys, ergot, quinine, mineral acids, and bark, in decoction, or the liquor cinchonæ may be given; and later still iron. The best preparations are the citrate acetate or chloroxide of iron, given in an effervescent form, or dialyzed iron. The doses at first should be small, so as to feel the way. Strict rest must be maintained, so as to economize to the utmost the feeble powers of the system. To promote this, sedatives to procure sleep are often of signal service. If opium can be borne, as it often is, it may be given with the saline, or separately, in the solid form, as the compound opium pill, in 5-grain doses, or as Dover's powder, in 10-grain doses. If it is not borne, we have a precious resource in chloral, which may be given in scruple doses. Since active hæmorrhage may induce a severe degree of anæmia, with consequent tendency to thrombosis in the iliac, femoral, or subclavian veins, great care is necessary to avoid exposure to cold or other disturbing causes.

Alcohol in the form of wine, or spirits, will at times act as an efficient sedative, as well as a stimulant. But stimulation, or "keeping the patient up," is often overdone. Stimulants must be given watchfully, and with discretion. Taken largely, they disturb the balance of the stomach, provoke vomiting, excite the circulation unduly, and may even maintain or cause a return of the hæmorrhage.

Light, easily assimilable nourishment should be given in small quantities, at short intervals.

THE SIGNIFICANCE OF NERVOUS PHENOMENA, INCLUDING THE VARIETIES OF PAIN.

It may be stated, as a general law, that pain referred to a particular part or organ is presumptive evidence of disorder, structural or functional, of that part or organ. Of course, in some cases, the disorder is only secondary or consequential upon disorder in some other part. Thus, one form of headache is the consequence of disordered stomach, and is cured by correcting the condition of the digestive organs. Pain in one part may be the reflex response to distress in another part. Of this we see repeated examples in the history of ovarian and uterine disease. Pain in the dorsal, lumbar, and sacral parts of the spine is a frequent phenomenon in connection with uterine disease. It is often the predominant symptom. The spinal pain may be so severe and enduring that it attracts the chief attention; and, unless the rule of interrogating all the functions be carefully followed, it is easy to fall into the snare of regarding the case as one of spinal irritation, vertebral disease, or simply hysteria. If this error be committed the patient will probably be doomed to a long course of mechanical or medicinal treatment, under which the general health may break down, the original disease pursuing its course all the while.

Attempts well deserving consideration have been made by observing the seat of the pains complained of, and interpreting by the knowledge of the sources and distribution of the nerves supplying the pelvic organs, to diagnose with something like precision the nature and seat of the pelvic disease.

There are certain facts which are so frequent in their recurrence and association as to lend weight to this method of analysis. But, like all other methods of clinical research conducted upon one line, it is exceedingly apt to lead astray. It is useful as a means, but not as the only means. We want help from every quarter.

Pain, in association with ovarian and uterine disease, is referred, first, to the region of the ovary or uterus itself; secondly, chiefly to the sacral, or lumbar, or lumbo-sacral region; thirdly, to the hips, thighs, and down the legs. In many cases pains may be said to radiate from the pelvis as a centre in various directions, as to the back, abdomen, and thighs.

Pain in an organ, arising during or aggravated by the performance of its functions, is especially presumptive evidence of structural disorder of that organ. This is true of pain during menstruation, and of pain in the performance of the sexual act. This part of the subject will be discussed more particularly under the heads "Dysmenorrhœa" and "Dyspareunia."

Pain described as in one or other inguinal region or rather deeper, is often referred to the ovary, and is taken as evidence of ovaritis, or of ovarian irritation. But in the great majority of instances this presumed ovarian pain is the signal of sub-acute or chronic inflammation of the neck of the uterus. This has been insisted upon by Dr. Henry Bennet. I find this pain so frequent in connection with disease of the neck of the uterus, there being no perceptible concurrent disease of the ovary, that I hesitate in every case to regard it as due to ovarian disease until I have examined by touch the ovaries themselves, as well as the uterus. If under touch we make out that the ovaries are swollen, and exhibit increased tenderness, we get the required confirmation as to the implication of these organs. I have several times obtained experimental proof of pain in the ovary being due to uterine disease. Touching the os uteri has caused pain referred to the region of the ovary.

By those who do not examine at all either uterus or vagina, except by external palpation, this ovarian pain is often called "ovarian irritation," or "ovaritis;" and to subdue it leeches, blisters, or irritating ointments are resorted to. This so-called "ovarian irritation," however, does not deserve to be ranked as a morbid entity demanding special treatment. There may indeed be irritation of the ovary; but then there must be something to irritate it. It is this something we should search for. And this something, in the majority of cases, has its seat not in the ovary itself, but in the uterus. The pain is more frequent in the left ovary than in the right. Pain referred to the uterus itself, intensified under touch, is often attributed to "irritable uterus," and this vague expression is sometimes accepted as a satisfactory diagnosis. Now, as in the case of "ovarian irritation," logic and clinical observation compel to the conclusion that since the uterus shows signs of being irritated, there is an irritating cause, which it is our business to find out.

Another expression which is often adopted as a conventional substitute for precise diagnosis is "neuralgia of the uterus," or "hysteralgia." These terms really mean nothing more than "pain in the uterus."

The same remark applies to "mastodynia," "the irritable breast," or "neuralgia of the breast." Pain in the breast may, indeed, be the expression of disease in that organ, and therefore justify direct examination. But pain in the breast is a frequent attendant upon dysmenorrhœa. It may be simply reflex or sympathetic, pointing to functional or organic disease of the uterus or ovaries. And where examination detects no hardness or swelling in the breast, pain in it, "neuralgia," may be taken as an indication for exploring the pelvic organs.

If, then, we consent to retain the terms "irritable uterus" and "hysteralgia," "mastodynia," it must be because they have, by long prescription, established for themselves a kind of footing in nosology; and not because they embody pathological entities.

Neuralgia of distant parts, as of the face or breast, is often, if not strictly symptomatic, certainly consequent upon uterine and ovarian disease. This dependence is often quite overlooked by physicians who devote special attention to neuropathy. Neuralgia, studied apart from its antecedents, is apt to assume much of the importance attached to an idiopathic or essential disease; and being treated accordingly, it persists rebellious against all the artillery of the Pharmacopœia. The following is the chronological history of a large proportion of the cases of neuralgia in women. Uterine disease, attended by hæmorrhagic and leucorrhœal discharges, saps the general strength, degrades the quality of the blood; then all the organs, especially those concerned in digestion and assimilation, being badly nourished, perform their functions imperfectly. Concurrently with this general impairment of nutrition, the nervous centres suffer; these centres become extremely susceptible to the exhausting influence of pain—and pain is constantly proceeding from the uterine disease. Thus the tone of the nervous centres is constantly being worn down, and preparation is made for every kind of irregular or aberrant nervous action. The nerves of the face, breast, and limbs become keenly sensitive to external impressions of cold, and to what are called the sympathetic impressions brought from internal organs. Neuralgia is the culmination of all this. To cure it we cannot depend upon quinine, morphia, actea, alteratives, the hot iron, or division of the nerve; we must trace the disorder back to its source, and by curing the uterine disease, arrest the primary cause of the blood-degradation and nervous wear and tear. This done, constitutional correctives and tonics will act beneficially, and we may reasonably expect the neuralgia to disappear.

The history of a vast number of cases of "hysteria" is exactly the same. In short, hysteria is commonly one phase of aberrant nervous action, the result of nervous exhaustion from disease and mal-nutrition.

Pains referred to the uterus, and described as "expulsive," "bearing-down," likened to colic, generally indicate *retention* of fluid, or solid matter, in the uterine cavity. This explains the chief part of the pain of dysmenorrhœa, though, no doubt, the ovaries, by their direct participation in the trouble of menstruation, and by the reflected distress from the uterus, contribute to the suffering. "Bearing-down pains" are also significant of uterine prolapsus, or retroversion.

Pain referred to the uterine region, causing the patient to bend the body forward, is often found in connection with sub-acute metritis and sub-involution of the uterus after labour. Pain in the lumbo-sacral region of a dull wearing character, attended with more or less impairment of the use of the legs, is frequently associated with retroversion and retroflexion of the uterus. The presumption that this displacement exists will be increased, if there is dyschezia and habitual constipation. The pain is probably not due so much to direct pressure of the body of the uterus, even when enlarged, upon the sacral nerves, as upon the indirect pressure occasioned by the accumulation of hardened fæces in the rectum.

Pains extending down the legs, especially if attended with sensation of numbness and a degree of motor paralysis, is presumptive evidence of pressure upon the sacral plexus and other nerves in the pelvis. This presumption acquires greater force if there be attendant œdema of the feet and legs, indicating pressure upon the pelvic and abdominal veins.

Pain and irritability of the bladder frequently attend anteversion of the uterus, or pressure from the uterus enlarged by fibroid, or the advance of cancer. It may also, of course, be the consequence of disease of the bladder or urethra.

Pains in either side of the pelvis, described as of a dragging character, and attended often with lumbo-sacral aching, is a frequent consequence of prolapsus. It is, in all probability, due to stretching of the uterine ligaments.

A pain, described as "throbbing," and attended with a sense of fulness, often precedes the onset of the menstrual flow, especially in women who, from the presence of tumours or other disease in the uterus, are subject to metrorrhagia.

A valuable presumptive test of the dependence of pain upon local diseases, especially inflammation or displacement, is the production or aggravation of it, after exertion and fatigue.

In some cases pain is relieved by walking or by the erect posture, and is aggravated by the sitting or recumbent postures. Where there is uterine disease, attended by inflammatory action or enlargement, the pain is usually aggravated in a remarkable degree by the kneeling posture.

Various reflex pains in distant parts are often associated with uterine and ovarian disease. The dorsal, lumbar, and sacral pains have been already referred to. Other instances are the occipital headache, the left hypochondriac stitch or pain, and pains in the breasts.

Pain, described as "pricking," "stabbing," "shooting," usually persistent, is commonly considered to be pathognomonic of cancer. In the advanced stages of malignant disease pain of this kind is not unusual. But it is by no means constant. Its presence cannot be accepted as proof of malignant disease, nor can its absence be accepted as proof of the absence of malignant disease. Physical examination alone can solve this question. Pain must be taken as an indication for examining.

Pains in one side of the body, attended with sensations of numbness and pricking, or tingling in the arm, and especially of the leg of the affected side, constituting what might be called pseudo-paralysis, are not uncommon at the climacteric age. They do not indicate ovarian or uterine disease, although the two conditions are frequently associated.

THE SIGNIFICANCE OF NEURALGIA; SPINAL IRRITATION; PARAPLEGIA; OTHER FORMS OF PARALYSIS; MENTAL DISORDER; VOMITING; CONVULSION; EPILEPSY; HYSTERIA.

Apart from pain, the significance of other nervous phenomena in relation to intra-pelvic disorder is often very great. These phenomena may be classed in this connection under the following heads. Signs of depression and exhaustion, mental or bodily, or commonly both, the result of continuing or recurrent pain, and changes of nutrition; nervous disorder, the evidence of toxæmia, resulting from the absorption or retention of noxious matter in the blood; sympathetic phenomena; reflex phenomena, mostly of a convulsive character, as vomiting, epilepsy, hysteria; central, as cerebral or spinal; irregular or aberrant nervous manifestations. The nervous phenomena, more especially associated with particular intra-pelvic conditions, will be described in their proper connections. In this place it will, however, be useful to point out concisely the chief indications furnished by the nervous accompaniments.

The significance of *Neuralgia* and *Spinal Irritation* has already been discussed.

Dr. Little, who has studied "spinal disease" in the broad clinical spirit, recognizes a class of cases in which the spinal affection is distinctly traced to disease of the uterus or of the rectum.

Paraplegia.—In some peculiar cases spinal irritation or weakness of the spine is associated with such loss of power over both legs that walking is all but impossible. Such a condition is chiefly observed after labour. We may conjecture that the first condition is one of shock or exhaustion of the nervous force attendant upon the labour; and undoubtedly there are cases where we fail to detect such persistent intra-pelvic disorder as could account for the nervous depression. But in the majority of cases, imperfect involution, catarrh, hæmorrhages, and, most frequent of all, retroversion or retroflexion of the uterus will be found. When these are relieved, it is sometimes astonishing to see how quickly the paraplegia disappears.

The *reflex nervous phenomena, as vomiting, convulsion,* are amongst the most striking attendants upon some cases of ovario-uterine disease. The vomiting of early pregnancy, the eclampsia associated with albuminuria of advanced pregnancy, link the physiology to the pathology of menstruation. The conditions of menstruation present close analogy to those of pregnancy. They throw a strong light upon each other. When vomiting recurs every morning, dating from suspension of menstruation, the first conjecture is of course in favour of pregnancy. The diagnosis of pregnancy will be discussed in a subsequent chapter. Here, it may be pointed out, that in many cases of dysmenorrhœa, vomiting is a reflex symptom; that in other cases it is a sign of uterine disease or displacement Sometimes vomiting is relieved by simply giving the uterus the support afforded by a Hodge-pessary. In other cases vomiting is the outcome of nervous exhaustion and degraded blood.

Epilepsy in numerous instances is associated with menstrual difficulty. When this dire disease occurs in young women, and especially if it has resisted ordinary means, the physical state of the ovaries and uterus should be investigated. The key to many nervous affections, more especially those of a convulsive character, will be found in the exalted nervous and vascular tension attending the menstrual nisus as well as pregnancy. It is a factor that must never be left out of account. I have discussed this with some care in my Lumleian Lectures.*

A remarkable feature of the neurotic affections of women is their *mimetic* aspect. This is most remarkable in the nervous phenomena of the climacteric stage of life. The term "pseudo" has been attached to some of the simulated conditions in order to express this, and also no doubt to evade the difficulty of giving a more accurate description. *Paralysis* in all its forms is often simulated, and sometimes so closely as to throw the physician off the true scent. Mental aberrations are common; and not seldom the patient dreads the issue in insanity. Sometimes, indeed, the transition is realized; the border-line is passed. But I am entitled to affirm from observation that a due and timely appreciation of the underlying associated conditions of the ovario-uterine system will often enable us to control these nervous aberrations within the limits of health; and in not a few cases to bring the subjects back within the line of reason which had been overstepped.

A similar argument will apply to that condition, or indefinite class of conditions, to which the vague term of *hysteria* is applied.

Much more might be said upon this theme. But these sections may be fitly closed with the two following clinical rules: 1. We must carefully bear in mind that any of the described nervous phenomena may depend upon or exist in association with disorders of the cerebro-spinal, thoracic, or abdominal organs.

2. That where they depend upon, or are influenced by, disorder of the ovaries and uterus, special symptoms of distress in these organs will rarely be wanting to furnish indications for local exploration, and to verify or to exclude this complication.

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* "On the Convulsive Diseases of Women," delivered before the Royal College of Physicians, 1875.

THE SIGNIFICANCE OF "DYSPAREUNIA," INCLUDING "VAGINISMUS."

I have ventured to introduce the term "dyspareunia" as a convenient and concise description of an affection which is often the immediate occasion of great physical and mental suffering, which is apt to entail the most serious disruptions of conjugal relations, and which is almost always a symptom of some morbid condition that admits of more or less successful treatment.

There is no disturbance of function, no subjective symptom which more imperatively dictates resort to physical exploration than difficulty or pain in the performance of the sexual function. In the great majority of cases dyspareunia depends upon some local imperfection or disease. In many instances it is not safe to neglect the warning which this symptom gives of something wrong; in many this neglect condemns the subject to the keenest agony—agony not the less hard to bear because affection or other motives too often induce her to conceal it.

The causes of dyspareunia may be classed under the congenital and the acquired.

Under *congenital conditions are ranged* absence or imperfection of the vagina or vulva; a dense unyielding hymen; too short a vagina, the uterus being set too low in the pelvis, so that the os uteri is within an inch or a little more of the vulva; undue length of the vaginal portion, or its projection as a conical mass into the vagina. I amputated by the galvano-caustic wire, a redundant vaginal portion, the cause of intolerable dyspareunia, with complete relief. In the case of the uterus being set too low in the pelvis, the vagina being short and not easily distensible, dyspareunia results from the uterus not being able to rise or retreat under the impact of the male organ. Hence congestion and inflammation not uncommonly arise. In many cases a compensatory condition is established in time, by the gradual dilatation of the retro-cervical vaginal roof. This is developed into a considerable pouch. Although the dyspareunia may gradually subside, the subjects often remain sterile.

I have met with a form of dyspareunia which, in one case, gave rise to the question of seeking for a divorce. The pubic symphysis was unusually deep and continued so far back that the vulvar fissure was carried far behind the normal seat. In this case, as in many others where ineffectual or unsatisfactory attempts at intercourse have been continued for a long time, an extreme degree of mental irritability and local hyperæsthesia had been induced.

Acquired Causes of Dyspareunia.—Amongst these are found: Contraction or atresia of the vulva and vagina, the result of disease, injury, or cicatricial processes. Cases belonging to this order will be discussed under "Atresia.

Almost all the inflammatory affections of the pelvic organs entail dyspareunia. Congestion and inflammation are commonly attended with increase of nervous irritability. Structures which in the ordinary state evince little sensibility become, when congested or inflamed, intensely painful. This is markedly the case with the vaginal portion. Proof of this is obtained when the finger presses upon it; by the speculum when the blades are being expanded, and the ends chafe against the inflamed vaginal portion; when in adapting a Hodge pessary the posterior limb is being pushed back across the os; in some cases, when the patient is at stool the solid motion pressing upon the tender os. In all these cases pain is complained of; it is not surprising that coitus should also be painful.

When the body of the uterus is enlarged from hyperæmia or congestion, especially when complicated with retroflexion, dyspareunia is an almost certain result. In this case on making an examination, touching the vaginal portion may not evoke pain; but pressure by the finger upon the body of the uterus, through the roof of the vagina or through the rectum, is almost sure to do it.

Inflammation or congestion of one or other ovary is attended by the same result.

A frequent cause of dyspareunia is colpitis or inflammation of the vagina, no matter to what the inflammation may be due. Thus inflammation from blennorrhagia, or from injuries during labour, will frequently render sexual relations intolerable.

When colpitis exists there is often entailed a spasmodic contraction of the vagina which greatly intensifies the suffering. This condition, for which Dr. Marion Sims proposed the name "Vaginismus," is exceedingly distressing. It may be likened to colitis or dysentery. The inflammation excites spasmodic contractions of the muscular coat and especially of the vulvar sphincter. The friction of the inflamed mucous surfaces against each other under these morbid contractions is the immediate source of pain, and it increases the inflammation and spasm.

The cure of dyspareunia here depends upon the cure of the colpitis. This is to be accomplished by "rest" in the most comprehensive sense of the word. It is mainly by its efficacy in securing rest from the spasmodic contractions of the muscular coat, that Dr. Marion Sims' and my instruments for keeping the walls of the vagina apart, act so beneficially. Two or three weeks' use of one of these instruments during the daytime, and lead lotions on removing it at night, will often effect a cure.

Pelvic cellulitis and peritonitis, whether in the acute or chronic stage, almost constantly entail dyspareunia. This is due not only to the increased sensibility attendant upon inflammation, but also upon the loss of mobility of the uterus. Whenever the uterus is fixed at a definite low level in the pelvis, unable to retreat before the propulsion of the male organ, dyspareunia is an almost inevitable consequence.

Hence this condition is frequently observed in cancer of the uterus, and in fibroid tumours affecting the lower segment.

Various conditions of the vulva are peculiarly apt to cause dyspareunia. This is not surprising when it is remembered that the structures of this part are richly supplied with sensitive nerves, and that they have to encounter the chief force and irritation. All the varieties of inflammation of this part necessarily expose the patient to this form of suffering. I have known it depend upon vascular excrescence of the meatus urinarius, and upon fissure at the fourchette, and removed when these affections were cured.

It attends pruritus and the follicular inflammation.

But the most severe distress is often produced when the entire circumference of the vulva is involved in a peculiar inflammatory process which may in many cases be traced to violent or unskilful attempts at intercourse.

In some of these cases there may be observed a dark-red angry-looking ring of inflammation around the orifice, sometimes even abrasions or slight fissures which easily bleed on touch, and generally the carunculæ myrtiformes present the appearance of swollen inflamed excrescences. This local inflammation entails extreme sensitiveness or hyperæsthesia; the slightest touch is intolerable; the patient shrinks at the very thought of examination, and actual touch excites uncontrollable spasmodic constriction of the part. This constitutes one of the conditions which may be included under the general term "Vaginismus," although the vagina itself immediately beyond the vulva may be quite free from disease. In some cases of this kind it is almost certain that there has never been complete intercourse. Indeed, where this condition is developed at the outset of married life, the dyspareunia and spasmodic contraction are so acute that complete intercourse is all but impossible. The distress, so long as the patient continues exposed to attempts at intercourse, is generally aggravated by time; health breaks down under the nervous exhaustion produced by repeated suffering, and what may be called the disappointment of Nature under an unfulfilled function. In some cases the irritability of the nervous centres becomes so great, the sensitiveness of the peripheral nerves at the vulva so acute, and reflex action thereby so intensified, that the attempt at intercourse will induce convulsion, or be followed by syncope. Exaggerated emotions, the conflict between affection and the dread of pain, may induce similar results.

Sometimes vaginismus is due to the presence of small fissures or sores on the edge of the perineum or vulva. These cases are analogous to those of spasmodic contraction of the anus from similar causes. Vaginismus and dyspareunia may also be occasioned by disease of the rectum, as fistula, or fissure, or inflamed piles. Indeed these reflected consequences are sometimes so much more extensive than is the direct distress at the seat of mischief, that the true origin of the pain is apt to be overlooked.

In some cases no lesion of surface, no inflammation can be discovered; and we are driven to the conclusion that the spasmodic irritability is due to hysteria or simple hyperæsthesia, or to emotional influences.

The *cure* of this painful affection obviously depends mainly upon a period of rest, that is, suspension of all attempts to renew sexual intercourse. The exhausted nervous system must have time and opportunity to recruit, the general health must be restored, and the local source of irritation must be relieved. To accomplish the last indication various measures are useful. In a first order of cases of minor severity, such as are not unfrequent during the first few days of married life, a few days' rest, fomentations with warm water, or tepid hip-baths, and the use of lotions or injections of subacetate of lead may be sufficient.

In a second order of cases of longer standing than the first, and including some cases where the difficulty has arisen after complete intercourse, and even after labour, the remedies mentioned may be most usefully supplemented by wearing for several hours during the day Dr. Marion Sims' dilator, or my "vaginal rest." The action of these contrivances is to keep the irritable surfaces apart, and thus, by avoiding the irritation of friction, to allow the inflammation to subside. They also further act beneficially by distending the vulvar orifice, stretching the muscular sphincter, thus wearing out spasmodic contraction, and using the parts to bear the presence of a foreign body. Vaginal pessaries, containing acetate of lead, belladonna, bismuth, borax, or zinc, and made up with glycerine, are useful adjuncts.

In the third and more serious order of cases surgical intervention will commonly be required. After subduing the acute inflammation by rest, fomentations, and lead lotions, it may be necessary, if the orifice of the vulva is found unusually small, to enlarge it by making two or three incisions through the skin on either side of the fourchette. The subcutaneous division of some of the fibres of the sphincter vaginæ has been recommended. This, if adopted, could be done by passing a tenotomy knife under the mucous membrane, just where it merges into skin at the posterior edge of the vulva, near the perineum, and when the knife has penetrated flatwise about an inch by turning the edge on and cutting outwards towards, but not through, the skin. A period of rest should follow this operation.

If there are remains of hymen, or carunculæ myrtiformes, presenting an inflamed hypersensitive condition, there is no remedy so effectual as the removal of these parts by the scissors. The operation is performed by putting the patient in anæsthesia, placing her in the lithotomy or in the semiprone position, with the nates hanging well over the edge of the bed or operating table. Assistants aid in holding apart the labia vulvæ by fingers or retractors, whilst the operator, seizing a portion of the affected structures with tenaculum forceps, snips them away all round, removing, if need be, a complete ring. The incision should not be deep, the affected structure being generally quite superficial. Some bleeding usually attends. This may be controlled by ice and by pressure, or styptic colloid. Pressure should be applied by plugging the vagina with pledgets of lint soaked in carbolized oil. The plug may be removed and renewed next day. During the healing of the surface it is well to wear an elastic vaginal rest. At the end of three or four weeks a cure will generally be effected.

Disappointment is apt to follow this operation if the smallest caruncle or other affected portion be left. Almost as much irritation and suffering may be maintained by the presence of a small remnant of diseased structure as if the whole were allowed to remain. Hence the expediency of carefully removing the entire circle.

In some cases where the hymen is very dense and the fourchette is thick and unyielding, so as to contract excessively the vulva, enlargement of the opening by slight incisions is the least painful and the readiest proceeding.

Scanzoni, summing up his own very considerable experience of cases of which vaginismus was the urgent symptom, opposes the use of the knife. He has always succeeded in bringing relief by first subduing all inflammatory complications, and next by effecting gradual dilatation by means of graduated glass specula worn for short intervals at a time. Courty cured a case by forcible stretching by the fingers under chloroform. This is carried out, the patient being in the state of anæsthesia, by introducing the two thumbs, back to back, and then forcibly distending the vulva for five or six minutes.

I have cured many cases by methods similar to those used by Scanzoni and Courty; but I have met with cases where the knife or scissors gave, in my opinion, not only the quickest and most efficient relief, but also at the least cost of pain and other distress. Certainly the judicious use of these instruments is far less painful than forcible stretching.

It is needless to observe that inflammation of Bartholini's glands is a cause of dyspareunia and vaginismus. The swelling attending this condition often nearly closes the vulva, and the pain is so exquisite that the slightest touch is intolerable.

Dyspareunia may be the result of imperfect or disproportionate development. This is a form not unfrequently observed in girls who marry too young. It may also be experienced by women who marry late in life. After the climacteric, especially in women who have not been accustomed to sexual relations, the uterus, vagina, and vulva undergo a kind of atrophic involution, in the course of which the vagina and vulva lose much of their glandular structure, and the tissues lose elasticity and distensibility. Sexual relations under these circumstances may be not only painful but even dangerous. There is a preparation in St. George's Museum of a vagina ruptured through the roof by the sexual act.

The condition called *coccygodynia* by Sir J. Simpson may also be a cause of dyspareunia.

It must be remembered that dyspareunia in women may in many cases be traced to the other sex. Imperfect, awkward intercourse induces a chronic, nervous irritability, which in turn renders approach intolerable. This is a not infrequent source of distress in couples ill-matched as to age and physical strength and disposition.

I think it important to insist that whenever a discharge of blood follows sexual intercourse, whether it be accompanied by pain or not, a local examination should be instituted. Bleeding excited in this manner is often the first indication obtained of the existence of organic disease of the uterus and vagina; and it is superfluous to say that the prospect of curing organic disease will in many cases depend greatly upon seizing the earliest indications.

THE SIGNIFICANCE OF STERILITY.

The discussion of the significance of sterility naturally follows upon that of the significance of dyspareunia. It may be stated, as an obvious general proposition, that dyspareunia entails sterility. Of course there are many exceptions; for although intercourse may be difficult and painful, still it may be accomplished; and numerous cases prove that complete intercourse is not necessary to impregnation. But these exceptions do not invalidate the general law that dyspareunia is an obstacle to fertility. This is further proved by the frequent occurrence of pregnancy when dyspareunia is cured. It is not simply because dyspareunia so frequently involves the suspension or incomplete performance of the sexual act that it entails sterility. Various conditions, as inflammation, displacement, which produce dyspareunia, are also often of themselves obstacles to impregnation.

This is proved by the fact that in numerous instances these conditions entail sterility, although sterility is not complained of.

It is no part of the object of an essentially clinical work to dwell upon the moral or social aspects of this question. But it is strictly within the scope of medical discussion to observe that sterility is not a purely negative evil, that is, the history of sterility is not summed up by saying that it is simply the negation of fertility. Complete sexual life in woman implies the due succession of the functions of ovulation, of gestation, and of lactation. The ovaries, the uterus, and the breasts ought in the natural cycle or order to relieve each other. Where the ovaries alone act continuously under the excitation of married life, a sense of an unfulfilled function arises which in many organizations is likely to induce physical as well as mental disturbance. The familiar saying that women in a certain condition of health would be well if they could have children is a popular mode of expressing this physiological fact.

Referring to the evils attending sterile marriage, Dr. West observes that chronic ovarian irritation and chronic congestion of the womb leading to hypertrophy and menorrhagia are apt to ensue. This is undoubtedly true; but I may remark that these cases would be less frequent, if the necessity of dilating the narrow os externum uteri were more generally recognized. When this is done, even although pregnancy do not follow, the injurious local affections are much less liable to arise. The significance of sterility, from a medical point of view, then, may be taken generally to be painful or imperfect sexual relations, some disease of the vulva, vagina, uterus, or ovaries, or disability on the part of the husband. Sterility is in itself a symptom or condition that may call for medical investigation and treatment, apart from the pain or other symptoms which take their rise in concomitant diseases.

In discussing the subject it is necessary to bear in mind the distinction between sterility in a woman from conditions inherent in herself, and sterility with potential fertility. It would be convenient if we could differentiate these cases by the appropriation to each of definite terms. Thus we might say a woman was "sterile" whose inherent conditions precluded her from conceiving, and we might say a woman was "barren" who was in every respect apt to conceive, but who remained childless, because, first, the fertilizing element was wanting; or, secondly, because if she conceived, the ovum did not come to maturity. We should fall into grievous error, however, if we were to conclude that sterility always implied an abnormal condition of the sexual organs in either the man or the woman. Numerous instances prove that sterility may be relative only. Certain degrees of affinity seem to be unfavourable to fertility. Upon this subject Francis Galton has adduced many most interesting and valuable historical and statistical illustrations. Thus, he shows in his book on *Hereditary Genius* how evil is the influence of consanguineous marriages.

Mr. Galton also shows the bad influence of marriage with "heiresses." Heiresses are presumptively single children, the feeble fruit of worn-out stock. Many peerages have become extinct through this. One-fifth of the heiresses have no male children at all, a full third have not more than one child, three-fifths have not more than two. It has been the salvation of many families that the husband outlived the heiress whom he first married, and was able to have issue by a second wife. "I look," says Galton, "upon the peerage as a disastrous institution, owing to its destructive effects upon our valuable races."

The researches of Galton are confirmed by those of Sir J. Simpson on the fertility of the peerage. Thus Sir James found that out of 495 marriages in the British peerage 81 were without issue, giving 1 in 6·11 as the proportion of sterile marriages; whilst 675 marriages in the villages of Grangemouth and Bathgate, one being agricultural the other seafaring, gave 65 sterile, or about 1 in 10.

The available materials for estimating the proportion of sterile women are very scanty, so much so that no precise deductions can safely be drawn from them. Indeed, here, as in so many other cases where the phenomena of life are concerned, the complicating conditions, and therefore the sources of fallacy, are so numerous that it is almost impossible to isolate the bare fact of sterility, the word being taken to imply incapacity, absolute or temporary, to bear children in any considerable number of instances, so as to make up a statistical column, all the constituent elements of which shall have equal value. Under the usual statistical process there remains nothing but a *caput mortuum*, from which all the facts, all the truth, have been sublimed away.

As a matter of general political interest, however, it may be stated that Dr. Farr calculates the mean fruitfulness of marriages in England in ordinary periods to be in every 100 marriages 420 children, giving an average of $4\frac{2}{10}$ children to every marriage. The subject is pursued in many of its bearings in Dr. Matthews Duncan's work on *Fecundity, Fertility, and Sterility*.

All speculations and calculations of this kind are obviously of little use in elucidating medical problems. The practical physician deals with the concrete, he has to study the individual case that comes before him; to search out the conditions associated with the particular disorder for which relief is sought; to endeavour to estimate the influence these conditions may exert upon the disorder; and by removing as far as he can all presumed interfering conditions, to enable nature to resume her course.

Applying this, the clinical method, we find that sterility in woman may be either *congenital* or *acquired;* it may be absolute and incurable, or relative and temporary. The cases may be ranged under the following heads :—

1. Those in which ovulation does not take place; or, if taking place, the escape of the ovule from the ovary is prevented. The ovary may be absent, in which case there will probably be absence or imperfect development of the uterus also. The ovary may be diseased, so that the Graafian follicles, *quoàd* their proper structure, may be destroyed. The ovaries may be covered with false membranes, forming an investment through which the ova cannot penetrate. There may be a general or local failure of nutrition arresting the maturation of ova. In such cases menstruation is generally absent. This condition may be temporary; indeed, it is often cured by appropriate constitutional treatment. It is exceptional for women who do not menstruate to conceive. But Bischoff relates a case which appears to show that an ovum may ripen, the menstrual flow occur, and sterility ensue, because the follicle does not burst. The ovum may decay in the Graafian sac. A not uncommon result of protracted difficulty of ovulation is gradual atrophy of the ovary, and hence entailed sterility. This fact is an illustration of the general law, that if an organ is long left idle it is apt to degenerate in structure, and to lose its functional capacity. Scanzoni further suggests that a diseased ovary may produce diseased ova.

2. Those in which the ovum may mature and escape from the ovary, but in which its due progress along the Fallopian tube and into the uterus is prevented. This is the case when the Fallopian tubes are absent, twisted, or severed; occluded by strictures, or false membranes; where the fimbriæ are absent (Baillie); where there is multiplication of the abdominal orifices, and pavilions (Richard); where the fimbriæ are bound down to neighbouring structures, so that they cannot be brought into apposition with the ovary. This was described by Ruysch. The uterus itself may be absent, or, as Courty calls to mind, may have no cavity. Fibrous tumours growing at the uterine orifices of the tubes, blocking them up, or in the walls of the uterus, especially of its lower segment and neck, by compressing and distorting the canal, may cause sterility. Indeed, when fibroid tumours exist, impregnation is comparatively rare.

3. Those in which obstruction is interposed to the meeting of the spermatozoa and ovum. This order necessarily includes the preceding cases; for the obstruction which arrests the progress of the ovum will equally arrest that of the spermatozoa in the opposite direction. But to the causes which arrest the ovum must be added those which block out the spermatozoa, as

atresia, congenital or cicatricial, of the os uteri, vagina, and vulva; those which produce closure or deviation of the uterine canal, as excessive involution or atrophy, tumours, polypus, versions, flexions; certain peculiar formations of the uterus, especially of its vaginal portion, as a narrow os externum, excessive hypertrophic elongation of the vaginal portion, whether original or acquired, offers a decided obstacle to impregnation. It is a not uncommon cause of dyspareunia. For this double reason I have amputated the part with success; tolerance of the sexual function, impregnation, and natural labour ensuing. Dupuytren, Huguier, and others have related cases in point, and Scanzoni relates one in which impregnation followed six weeks after amputation of the hypertrophied posterior lip.

Excessive development of the labia vulvæ may prove an obstacle to intercourse. In such a case resection is indicated, and may be safely performed.

Some cases of double uterus and vagina, as the following:—Dr. Laaser describes* the case of a lady who had been married several years without pregnancy. On examination it was found that the finger entered easily into a capacious vagina of normal length, which ended above in a nearly blind sac. There was only a rudiment of a vaginal portion without os uteri; but there was a longitudinal septum forming a smaller vagina, which latter was surmounted by a portio-vaginalis and os uteri. It was presumed that the uterus was also double. The sterility was accounted for by the blind vagina only being used, the vagina connected with the normal cervix being pushed aside. The septum was slit, so as to throw the two vaginæ into one.

4. Those in which there is some imperfection in the performance of the sexual act. If Velpeau and Rainey be right in their view of the use of the round ligaments in drawing forward the fundus of the uterus, so as to throw back the os uteri into direct relation with the penis during ejaculation, and if this relation is as a rule necessary for impregnation, the reason why women who are the subjects of flexions, displacements, and disease of the uterus are so commonly sterile, is partly explained. This relation is absent in many cases where the vagina is unduly short, where the uterus seems set too low down in the pelvis, and where—under the effect of intercourse—the vagina is gradually lengthened by stretching into a pouch extending considerably above and behind the os uteri. In many cases it is not simply the flexion which prevents impregnation by distorting the uterine canal and throwing the os uteri out of relation, but the secondary accidents, as inflammation or congestion, attended by unhealthy secretions, which act adversely. It is of course necessary that the seminal fluid should be retained. But there

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* "Monatsschrift für Geburtskunde," 1864.

are cases, including many in which the vagina being too short, shallow, and irritable, it is forcibly expelled by spasmodic contraction. It has been said that spasmodic stricture of the os internum may cause sterility; but the reality of this condition is not easy to prove. I have also known cases of extreme gaping of the vulva, from laceration of the perineum, in which impregnation did not take place until the normal condition was restored by operation.

5. Those in which unhealthy secretions are formed, unfitted for the maintenance of the vitality of the ovum and spermatozoa. Donné observed that some kinds of vaginal secretion instantly killed the spermatozoa. The qualities shown to be uncongenial are excessive alkalinity of the cervical mucus, excessive acidity of the vaginal mucus, the mucus of uterine catarrh, and other abnormal secretions; indeed, any secretion excessive in quantity amounting to leucorrhœa is also likely to have an unfavourable effect. Menorrhagia is often attended by sterility.

Sterility where a vesico-vaginal fistula exists is not, of course, a necessary result, but it is nevertheless frequent.

6. Those cases in which the mucous membrane of the uterus is unfitted to afford a nidus for the impregnated ovum. Thus there is a class of cases—and it is a large one—in which pregnancy fails, not because there is an obstacle to impregnation, but because the structures upon which the ovum should be grafted and supported are not in a condition to perform their part. In such an event the ovum, falling as it were upon bad soil, decays. The break-down occurs at variable periods. In many, probably, the ovum hardly gets any hold of the unhealthy mucous membrane or decidua. In many others, the mucous membrane undergoes the proper development for a stage, then breaks down. In many cases also there is little doubt that the ovum itself, although impregnated and engrafted on the decidua, perishes from inherent defect. We thus see how, by a large class of cases, sterility is brought into relation with abortion. It may seem paradoxical to say that many of the causes of sterility are also causes of abortion; but the proposition is nevertheless true. Some of the conditions above described, such as a minute os uteri externum and flexions of the uterus, do not oppose absolute obstruction to impregnation. But when this occurs, especially in the case of retroflexion, abortion is very apt to ensue. The same is true of hypertrophy, engorgement, ulceration, attended or not with displacement. In these conditions impregnation is not very rare, but the unhealthy state of the organ will be apt to lead to abortion. There is a kind of hyperplasia of the mucous membrane, sometimes depending upon a strumous, sometimes upon a syphilitic diathesis, which is very unfavourable to the support of the impregnated ovum. It is liable to undergo fatty degeneration, and to break down.

Abortion is the result ; and when this happens, as it often does, repeatedly, other chronic changes, as hypertrophy, engorgement, are more and more likely to ensue, and to add new obstacles to impregnation and gestation.

Ovarian irritation is also likely to cause sterility and early abortion, especially when it leads to menorrhagia. Excessive and prolonged flow will so alter the mucous membrane that it becomes unfitted to form healthy decidua. And if impregnation have occurred, the ensuing menstrual nisus, too powerful to be controlled by the pregnancy, may be attended by a profuse hæmorrhage which brings about extravasation into the decidua, or such other disturbances in the uterus as are incompatible with the maintenance of the ovum. In many cases of this class it is difficult or impossible to determine whether impregnation have taken place or not, that is, whether or not the case be one of early abortion. The practical result, however, is the same, and the indication for treatment is the same. Correct the unhealthy state of the uterine structures, allay the morbid irritability of the ovaries, and not only will impregnation be likely to occur, but the ovum may be supported and matured.

By far the most common associated conditions with sterility, in my experience, are congenital narrowing of the os externum and retroflexion of the uterus. These conditions are frequently combined. They are commonly attended by dysmenorrhœa; and dysmenorrhœa is often presumptive of sterility. The importance of this narrowing of the os externum uteri as an obstacle to impregnation is questioned by some physicians, and amongst others by Scanzoni. He urges that he has known impregnation take place where the os externum was no bigger than a millet-seed. Of this I too have seen examples, but I am satisfied from very extensive observation that these cases are quite exceptional. So preponderating is the association of a minute os externum and retroflexion, separately or combined, with sterility, that in any given case of a woman who remains sterile five years after marriage and suffers from dysmenorrhœa, it may be predicated with almost certainty that one or other, or both of these conditions exist. That these are efficient causes of sterility is further proved by the frequency with which pregnancy follows upon their removal. Of this I have seen many striking examples, Two sisters, both young, were referred to me by their brother, a former pupil. Both had always suffered from dysmenorrhœa, which had been increased by marriage, and both remained sterile after two to four years. In both I found exactly the same congenital formation, namely, retroflexion of the uterus and a minute os externum. In both I divided the os externum and corrected the retroflexion by the use of a Hodge-pessary. Both were relieved of the dysmenorrhœa, became pregnant, and bore children. This subject will be further discussed under the head of "Dysmenorrhœa."

Treatment.—Examining the foregoing summary of causes from a therapeutical or practical point of view, it will be seen that there is one order of cases in which the sterility is absolute from defect of structure or other conditions which cannot be removed, and which render impregnation impossible. The number of such cases is not great.

We see another order of cases in which there exists some mechanical obstacle, congenital or acquired, which may be removed by surgical operation. The number of these cases met with in practice is considerable. Fecundity in these exists potentially. It is only necessary to remove the obstructions.

We see another order of cases in which actual proof of fecundity has been given by the birth of a child. With this one effort the capacity seems to be exhausted, at least for a time. This is "acquired sterility." This condition is in some cases due to excessive involution of the ovaries and uterus, which shrinking, appear to undergo premature senility. In other cases it is due to the flexions, hypertrophies, subacute inflammations attended by unhealthy secretions which sometimes follow labour. In these the sterility commonly ceases with the cure of the abnormal condition. In some, however, in which there has been pelvic peritonitis, the ovaries and tubes may have been involved in membranous adhesions which impede the escape of ova or their reception into the tubes. But it must not be supposed that pelvic peritonitis is a necessary cause of sterility. I have known many cases where there was no interruption to subsequent pregnancies. Peritonitis may cause temporary sterility by binding down the uterus in an unfavourable position, especially in retroversion. This will often admit of cure by wearing a suitable lever-pessary, which, constantly tending to lift up the fundus, puts the adhesions on the stretch, and gradually causes their removal by absorption.

The waters of Schwalbach and Kreuznach have acquired a reputation for the cure of sterility. It is true that a number of women have become pregnant after visiting these places; but I have good reason for saying that in some of them at least the happy result was not due to using the waters. Some had previously tried them in vain, and having subsequently been submitted to surgical treatment for the removal of physical impediment, had returned to Schwalbach or Kreuznach, and then conceived. In some cases, however, those for example which depend upon chronic engorgement or hyperplasia, with unhealthy secretions, the influence of change of air, repose, and the use of saline chalybeate and iodized waters in curing these conditions is decided; and these being cured, the attendant sterility will often disappear. With this qualification, I can speak well of Schwalbach, Kreuznach, and other places but they do not deserve the blind faith which many patients and some physicians award to them. The rational course is to remove all abnormal local conditions first, and then, but not till then, the patients may be sent to Schwalbach or other convenient place for time to do the rest.

The above-mentioned conditions account for a large proportion of the cases of sterility. All these conditions may, in the majority of instances, be remedied, and in all the prospect of impregnation is reasonable. That disappointment in this respect will occasionally follow, even when a detected associated morbid condition is removed, is no valid argument against treatment. It is sound practice to remove every abnormal condition we can. It is possible that any given abnormal condition which we discover, and which we know is in itself sufficient to entail a certain result, may be the only cause. It is of course possible that another cause lying beyond the first may co-exist, and continue after the first is removed; but there is no harm done in removing the first. On the contrary, the first detected condition is often the cause of other evils beside the particular one which it is our special object to cure; and it not infrequently happens that the removal of one condition opens the way to the discovery and cure of other conditions.

In short, the obvious principle of acting is to obtain as healthy a state as possible of the genital organs. The vulva, vagina, and uterus, and in some cases the Fallopian tubes, are within our range. When this portion has been brought into a satisfactory state, and when all morbid action of the ovaries has been subdued, we shall have overcome a very large proportion of the causes of sterility. The residuum will comprise those cases of obstruction from adhesions of the tubes and ovaries, of ovarian disease or defective development, which are mostly beyond the reach of successful treatment.

Sterility being, in so far as the fault lies in the woman, a consequence of some abnormal condition of the sexual organs, the treatment of it is involved in the treatment of these abnormal conditions. These cover a wide range of ovarian and uterine pathology, and form the subject-matter of this work.

Sensual gratification is not necessary to conception; neither does its absence preclude conception. The essential condition is that the fertilizing element should have ready entrance to the cervix uteri at the right time. Failure in this condition may result from a variety of causes in persons in whom no fault of structure in the ovaries or uterus can be found. Ovulation may be perfect, the Fallopian tubes and uterus may be healthy, the elements on both sides may be normal, and yet there may be persistent sterility. It is difficult to follow out this subject minutely. Some of the conditions referred to hardly fall within the scope of strictly medical discussion.

It is not, however, out of place to remember that the cause of sterility may reside in the man. It is customary to say that sterility in man is extremely rare. I am inclined to think otherwise. It does not fall within the design of this work to investigate the causes of sterility in the male sex. But I may refer to Mr. Curling's work on the *Diseases of the Testis* (3rd edit.) for the best information on this subject. He confirms by precise observations the opinion expressed by John Hunter, " that when one or both testicles remain through life in the belly, they are exceedingly imperfect, and probably incapable of performing their natural functions." Thus, Mr. Curling shows that in cryptorchids the seminal fluid is commonly destitute of spermatozoa. In nine men this was ascertained to be the case, and their wives were barren. Several of these did not seem to be deficient in copulative power, and emissions occurred.

When, therefore, we find no marked abnormity in the wife, we must consider the possibility of defect in the husband; and it will be proper, before subjecting her to a distressing and perhaps painful course of treatment, to ascertain whether the fault is not on the other side.

CHAPTER III.

SIGNIFICANCE OF SYMPTOMS CONNECTED WITH BLADDER AND URINARY DISORDERS IN RELATION TO UTERINE AND PERI-UTERINE AFFECTIONS:—RETENTION OF URINE; ISCHURIA; PARTIAL RETENTION; INCONTINENCE; CYSTITIS; ABNORMAL MATTERS IN URINE:—BLOOD, PUS, FÆCULENT MATTER, HAIR, FAT, BONES, ALBUMEN—SIGNIFICANCE OF; MALIGNANT DISEASE OF BLADDER, PRIMARY AND SECONDARY; DYSURIA. SIGNIFICANCE OF SYMPTOMS CONNECTED WITH RECTUM AND OTHER BOWEL-DISORDERS IN RELATION TO UTERINE AND PERI-UTERINE AFFECTIONS, HÆMORRHOIDS, FISSURE, DYSCHEZIA, CONSTIPATION, RETENTION OF FÆCES; COPRÆMIA; BLOOD, PUS, MUCUS IN THE FÆCES; HAIR, TEETH, BONES, FŒTAL ELEMENTS.

When a patient complains of pain in a particular organ, or of difficulty in the performance of its function, it does not necessarily follow that that organ is the real seat of disease. This is eminently true of the bladder in women; so true, indeed, that in the majority of cases of bladder distress the cause will be found outside the bladder. To estimate rightly the significance of subjective complaints referred to the bladder, we are therefore necessarily led to institute an objective examination not alone of the bladder but of the other pelvic organs as well. The bladder is so intimately associated with the uterus and vagina, and so constantly participates in the affections of these organs, either directly or indirectly, that the clinical study of symptoms referred to it is daily forced upon the gynæcologist. In many instances these symptoms are induced by disease of the uterus, ovaries, or vagina; the bladder being only affected by irritation propagated from its neighbouring organs, or being hindered in its function by pressure of these organs displaced or enlarged. *Proximus ardet.* In another series of cases, disease commencing in the uterus or vagina spreads to the bladder, when symptoms of bladder disease will, of course, be added to those of the primary disease. In a third series, the primary seat of disease is in the kidneys or bladder. I think it may be affirmed that cases of this last series are the least frequent. In these cases the chief symptoms will naturally be referred to the bladder, but uterine or ovarian distress will often be entailed.

As it does not fall within our theme to discuss the strict diseases of the kidneys and bladder, it may be useful to point out at the onset the leading indications by which they may presumably be distinguished from cases of the first two series, and especially from those of the first. Strict kidney and bladder diseases are recognized by functional derangement of those organs, by correlated constitutional disorder, by alterations in the characters of the urine, and by physical examination. Severe pain in the region of the kidneys, occurring in paroxysms, attended by vomiting, and the presence of pus, blood, gravel, or calculi in the urine, point to the kidney as the source of trouble. The presence of albumen, casts, uric acid, oxalic acid, sugar, pus, or blood, usually points to structural changes in the kidneys or bladder, or to functional disorder of the nutritive apparatus. This proposition is generally true; but pus and blood may find their way into the bladder through a fistulous communication with an ovarian cyst, or be formed in the bladder as the consequence of obstruction to excretion. So that even the most probable indications of strict kidney and bladder distress should not turn us away from the direct exploration of the neighbouring pelvic organs. Of course this exploration will be the more imperative if we learn that there are subjective symptoms referred to the ovaries, uterus, or vagina. If we follow the rule of systematically investigating the condition of all the pelvic organs when one of them shows signals of distress, we may now and then discover, *after the event*, that we have done something superfluous, but we shall always have the satisfaction of knowing that we have taken the best course to avoid error in diagnosis, and consequent risk of adopting useless or injurious treatment.

There are

BLADDER COMPLICATIONS DUE TO MECHANICAL CONDITIONS OF THE PELVIC ORGANS.

Of these the most important is *retention of urine* from obstruction of the urethra. This imperiously urgent symptom may come on suddenly, or it may be preceded by attacks of dysuria or partial retention. In almost every case retention of urine in women is the consequence of pressure arising outside the bladder. It is therefore a symptom, not of bladder disease, but of disorder of other pelvic organs. Retention from atresia or stricture of the urethra, or from blocking by a calculus, is extremely rare in women. The canal is short, of large bore, and easily distensible; in all these respects differing from the male urethra. Pressure may be developed in a few hours so as to completely compress the urethra against the symphysis pubis. The bladder filling above the obstruction, the symptoms of retention quickly follow. Or the pressure may be developed very slowly, as when a fibroid tumour is enlarging in the pelvis. So long as the pressure does not completely obstruct the urethra, the retention will be only partial. Or the retention may be intermittent. This may be due to changes in the position or size of the obstructing body. All pelvic tumours are apt to induce more pressure at the menstrual epochs than in the intervals. This is not necessarily because the tumours themselves are increased in bulk at these times, but more often because of the general increase of turgidity of all the pelvic structures.

The diagnosis of retention of urine is not always easy; at least, in practice it is occasionally not made out. This is because retention is rarely absolute. Under the enormous hydrostatic and expulsive pressure brought to bear when the bladder is greatly distended, a little urine will be driven along the urethra, and escaping externally, impose upon patient and attendants the belief that the bladder empties itself.

Stillicidium, or dribbling attended by that form of dysuria which may be called bladder-tenesmus or straining, is presumptive evidence of retention more or less complete. It may look paradoxical, but it is nevertheless true that the loss of control over the sphincter vesicæ, resulting in loss of power to hold the urine, is proof of retention. Since retention cannot be endured many hours without involving the risk of serious damage to the bladder and kidneys, and the absorption of urinous elements into the blood, early recognition of this state is of primary importance. It should therefore be established as a rule in practice, in all cases of stillicidium, as well as of complete retention, to examine by catheter.

We may know that the bladder is distended when the sense of relief is not complete; when pain is still referred to the pelvis and hypogastrium, and accompanied by recurrent attacks of impressible bearing-down or straining efforts; and when a tense swelling has formed in the lower abdomen. When the swelling due to accumulation is great, we may fail to find distinct fluctuation. The tension is too great. But there will be dulness on percussion extending as high as, or even above the umbilicus; increase of pain on pressure; and the shape of the tumour, if the abdominal walls are thin and yielding, is peculiar. The bladder keeps close to the anterior abdominal wall. It points more under the umbilicus than does the pregnant uterus or an ovarian tumour. Both these spread more laterally, and, of course, have other characteristics peculiar to themselves. Vaginal examination will commonly give confirmatory evidence. If there is obstruction from a retro-uterine mass, the os uteri will be found jammed close behind the symphysis pubis. In other cases, the distended bladder throws the uterus backwards, especially the fundus; and thus the brim of the pelvis is felt through the vaginal roof to be occupied by a smooth tense body, the base of the distended bladder. On pressing this with the finger, whilst the other hand presses upon the abdominal swelling, some urine will be forced out of the urethra. When the catheter is passed, in proportion as the urine runs off, the tension being lessened, fluctuation becomes more distinct; the abdominal tumour subsides; and the vaginal roof-stretching is relaxed.

The quantity of urine retained is sometimes very large. It may amount to three quarts or more. When the retention has lasted twenty-four hours or longer, the urine drawn off will usually be turbid, sometimes smoky from sanguineous exudation, ammoniacal, and commonly extremely offensive. Considerable relief follows the evacuation, but not so complete as might be expected. A low degree of cystitis may have been induced, and the extreme distension to which the bladder has been subjected will leave a degree of paralysis of the muscular coat. Hence the urine is liable to accumulate again, even although the obstructing cause may have been removed. Therefore the practice of passing the catheter two or three times a day should never be omitted until we get certain knowledge that the bladder has fairly recovered its tone. This is shown by the freedom from local distress, by the consciousness that urine is passed in a stream, and by our finding on passing the catheter that only a moderate quantity of limpid urine is drawn off.

The effects of retention of urine, if not timely relieved, are:—The bladder, it is said, may burst. This may be looked upon as a possible rather than a probable event. I do not know of a case in which this catastrophe has happened. Three compensating factors are at work to obviate it. These are: stretching of the bladder, overflow by dribbling, absorption of part of the urine. Long before bursting could take place the patient would die from exhaustion by pain, by the structural changes produced in the bladder and kidneys, and by blood-poisoning. The first effect upon the bladder is irritation, which leads on to congestion, and then to inflammation of the mucous coat especially. This is the most common form of cystitis. The intense congestion leads to exudation of blood into the urine. If the interior of the bladder is seen at this stage it looks swollen, pulpy, dark-red or even black, and viscid mucus mixed with blood may be adhering to the mucous membrane. The swollen mucous membrane and viscid mucus entangle the deposits which soon take place, so that the inner surface is often coated with triple phosphates.

From a moderate degree of congestion and inflammation the bladder may recover. But if the retention be long continued the mucous membrane may be cast off. Several cases of complete exfoliation are known. This, in itself, is not a fatal accident. Several patients have recovered. One of them I saw at the London Hospital. When the exfoliation occurs as the result of severe labour, the duration of the retention need not be very protracted. Twenty-four hours may be enough. But in these cases there is commonly superadded considerable contusion of the bladder from the pressure of the child's head or by instruments. But if where it results from simple obstruction of the urethra, usually a much longer time has elapsed. Protracted retention after severe labour has in several cases been followed by exfoliation of the mucous membrane. The membrane separates from the bladder in shreds, or as a whole, so that when extruded it represents a perfect cast of the bladder. In one specimen which came from a woman who had suffered a severe labour, and which was given me by Mr. Nicholson, of Stratford, the substance did not present the elements of mucous membrane; it was a tough fibrillated tissue coated with phosphatic crystals. It had been pulled out in shreds through a vesico-vaginal fistula, which bore evidence to the difficulty of the labour. But in other cases the true characters of mucous membrane have been distinctly recognized. Dr. Wardell relates a case.* Spencer Wells relates two cases.† Dr. J. J. Phillips gives another.‡ Dr. Schatz has also described and figured one.§ Where obstruction to the voiding of urine is found from the presence of some substance blocking the urethra from within, it would not be difficult to give relief by dilating the urethra and drawing out the substance by forceps or by a small blunt hook. Rest, demulcent drinks, and sedatives would diminish irritation whilst a new mucous membrane was forming.

The next effect of retention, and one which very quickly follows, is absorption of some of the fluid collected in the bladder. Hence symptoms of urinæmia are rarely wanting. But this absorption will not avert retrograde pressure upon the ureters and kidneys. This leads to distension of the ureters and pelvis of the kidneys, and then to arrest of secretion. Congestion of the kidneys easily merges into nephritis. Some degree of albuminuria is not uncommon; and the elements which ought to be secreted from the kidney, thrown back upon the blood, the circulation is further poisoned, and brain-symptoms arise. This, I think, is the most common cause of death.

If the patient survive, *chronic cystitis and chronic nephritis* are very probable events. After the retention is relieved and the bladder has recovered some amount of power, the whole urinary tract is liable to chronic inflammation.

Peritonitis sometimes follows retention of urine. It will of course be sometimes difficult to assign this with certainty to the retention, where great disorder of other pelvic organs which led to the retention co-exists. But in some cases there is reason to suspect that, under the enormous pressure exerted by the distension of the bladder, increased by the futile efforts to expel its contents, some degree of oozing or permeation of the urine may have taken place through the coats, and thus have produced irritation of the peritoneal investment.

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* "British Medical Journal," 1871.

† "Obstetrical Transactions," vols. iii., iv.

‡ "British Medical Journal," 1871.

§ "Archiv für Gynakologie."

Starting, then, with the proposition that retention of urine may be caused by compression of the urethra against the symphysis pubis, we may usefully pursue the subject by inquiring what are the various causes which may exert this injurious compression.

We may bring these causes into the following groups:—

I. Conditions inherent in the uterus itself.

II. Conditions external to the uterus, but acting for the most part by driving the uterus against the bladder, and this against the pubic symphysis. The situation of these is of course behind the uterus. Other conditions have their seat in front of the uterus. Others have a lateral position.

III. Vaginal conditions.

IV. Conditions depending upon labour or the puerperal state.

V. Conditions, mostly dependent upon nervous disturbances, which do not fall under any of the preceding groups.

I. If we analyze more precisely the conditions that fall under these several heads, we shall find in the *uterine* group:—

1. Retroversion or retroflexion of the uterus, gravid or not gravid.
2. Prolapsus of the uterus, gravid or not gravid.
3. Anteversion or anteflexion of the uterus, gravid or not gravid.
4. Recent inversion.
5. Enlargement and locking in the pelvis, more or less displacement attending.
6. Hæmatometra, or retention of blood in the uterus, from atresia of the os uteri or vagina, or occlusion of the vulva.
7. Tumours in its walls or cavity.
8. General hypertrophy from hyperplasia.
9. Thrombus in the uterine neck.

II. *Causes external to the uterus.* Many of these act, partly at least, by producing displacement of the uterus. The chief of these are:—

A. *Bodies getting in front of the uterus*—that is, between it and the bladder; as—

1. Ante-uterine hæmatocele or blood-effusion in the cellular tissue between the cervix uteri and the bladder.
2. Ante-uterine phlegmon, or abscess in the same tissue as the effusions of blood.

3. Rarely, an ovarian tumour, the dermoid variety being the more probable.
4. Malignant disease binding the bladder to intestine or other adjacent structures.

B. *Bodies getting behind the uterus.* These are more common and more important than the preceding. The principal ones are—

1. Retro-uterine hæmatocele.
2. Collections of inflammatory effusions, serous, fibrinous, or purulent, the result of peritonitis, general or pelvic, or of cellulitis.
3. Ovarian tumours, dermoid or cystic, of such moderate size that they can, wholly or in great part, be retained in the pelvis.
4. Extra-uterine gestation-cysts.
5. Collections of fæces in the rectum.
6. Tumours in the rectum, or springing from the pelvic walls.

C. *Bodies on one or other side of the uterus.* These, generally, when they cause retention of urine, get somewhat behind the uterus also. The principal are—

1. Inflammatory effusions, the result of peritonitis, general or pelvic, or of pelvic cellulitis.
2. Ovarian tumours.
3. Other tumours in the broad ligaments.
4. Tumours or distension of the Fallopian tubes.

III. Certain *conditions of the vagina* form a sufficiently characteristic group. These are—

1. Tumours formed in the walls of the vagina, or contained in the canal, as dependent uterine polypi, or the inverted uterus.
2. Phlegmon or abscess in the walls of the vagina.
3. Plugs introduced to arrest uterine hæmorrhage.

IV. The group of *puerperal causes* would include some of the causes stated in the foregoing groups, but it is of especial clinical convenience to consider these in their relation to labour and childbed, a study beyond the scope of this work.

V. There remain yet other causes of retention of urine which do not fall within any of the preceding groups. Some of them may be traced to *nervous disturbance or aberration*, as—

1. Retention following upon operations upon the neck of the uterus. This is strictly analogous to the retention which sometimes ensues upon operations upon the rectum in the male subject.
2. Retention, partly voluntary, induced by dread of pain during micturition when neighbouring organs are diseased.
3. Hysterical retention.
4. There is a form of temporary recurrent paralysis, which

cannot be called hysterical, in which, the proper moment for the evacuation being lost, it is found that the bladder refuses to act at a later time, and the catheter has to be resorted to. In some cases I have seen there was no neighbouring disease and nothing abnormal in the urine.

5. Paraplegic, or from progressive general paralysis.

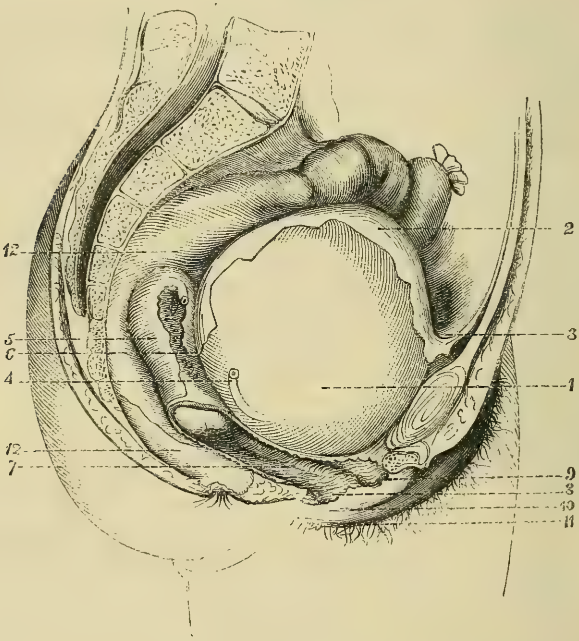

Fig. 38.

SHOWING THE SITUATION, DIRECTION, AND RELATIONS OF THE UTERUS WHEN THE BLADDER IS FULL—(AFTER SAPPEY).

1, bladder distended with water; 2, fundus of bladder rising 1½ inches above the symphysis pubis, and remaining well behind the abdominal wall; 3, cul-de-sac of peritoneum formed by passing from abdominal wall to bladder. It comes down close to the upper edge of the symphysis; 4, end of right ureter; 5, uterus driven back as well as the vagina, 7; 6, utero-vesical cul-de-sac; 8, lower end of vagina; 9, meatus urinarius; 10, 11, labia of vulva; 12, rectum much depressed by uterus.

Lastly, we must be careful not to mistake suppression of urine for retention. Suppression rarely occurs except in association with fever. The catheter, by showing that the bladder is empty, establishes the diagnosis.

Mere retention of urine can, of course, be relieved for the time by the simple use of the catheter. But as this does not touch the cause, retention will recur. It becomes, therefore, indispensable to determine what is the particular cause. For this it is necessary to institute a thorough physical examination of the pelvic organs. The history of the case may help: and it may mislead; for in medicine, as in politics, trustworthy history is not easily found. We may, indeed, at once eliminate some of the causes we have enumerated by noting the age and other conditions of the patient. Thus we shall exclude the probability of causes depending upon pregnancy in women whose age is incompatible with that state. By similar reasoning we may in most cases quickly dispose of a considerable number of causes, and be enabled to reduce the problem within narrow limits. But in the end we must fall back upon local examination, not only to establish an accurate diagnosis, but also for the purpose of treatment.

Fig. 38 is introduced to illustrate the effect of artificial distension of the bladder. Like all illustrations drawn from the dead body, it must be accepted with some qualifications. The conditions in the living are often very different.

Charcot describes *hysterical ischuria,** and vindicates the claim of this affection to restoration to the place in pathology from which scepticism had discarded it. In ischuria of hysterical patients the obstruction is not situated in the urethra or in the bladder. It lies higher up, either in the ureters or in the kidneys, or still more remotely. The principal fact is that the quantity of urine secreted in the twenty-four hours, and withdrawn by the catheter—for hysterical ischuria is almost always complicated by urethral retention—is remarkably under the normal amount. It is even frequently reduced to zero, and during several days there is absolute suppression of urine.

As Laycock wrote,† *oliguria,* or even *total suppression of* urine may be only a transient phenomenon. This we occasionally observe in hysterical patients, especially at the catamenial periods, a complete suppression, which does not last more than twenty-four or thirty-six hours. There may, perhaps, be some feeling of uneasiness, and the pulse may be quickened; but after a short time a few spoonfuls of urine are expelled, and the normal state is restored.

In other more serious cases the ischuria is protracted. For several days there is no secretion. In these another phenomenon is superadded. Repeated vomitings occur so long as the ischuria lasts. The vomited matter occasionally, it is said, presents the appearance and exhales the odour of urine. Charcot points out that in experiments on animals a vicarious elimination (of urea) is effected by the intestine; and that so long as this elimination takes place the animals seem to suffer little inconvenience; that it is only when they become enfeebled, and the supplementary excretion ceases that grave phenomena appear. But in hysterical women the alternation between renal excretion and vicarious excretion may continue for weeks and months, without any visible disturbance of the general health.

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* "Lectures on Diseases of the Nervous System," New Sydenham Society, 1877.

† "A Treatise on the Nervous Diseases of Women," 1840.

The great point, of course, in a clinical point of view, is to distinguish ischuria from retention. The catheter is the indispensable means of solving this difficulty.

It is important to remember that ischuria may happen in women quite independently of hysteria. It is one of the immediate causes of death where cancer, spreading from the uterus, invades the bladder, and retrograde obstruction induces compression and atrophy of the glandular structure of the kidneys.

Irritable bladder, by the uncontrollable reflex forcing pains induced, may cause subjective signs which the patient may readily ascribe to prolapsus of the uterus.

The chief means of *diagnosis* are: the touch, vaginal, rectal, and abdominal; the sound; the catheter; the aspirator-trocar. The speculum is rarely useful in these cases, and in many it could only be introduced with difficulty and pain.

The first step in diagnosis and in treatment is to pass the catheter. This, by emptying the bladder, reduces the case to a simpler condition, and facilitates the application of other modes of exploration. The vesical tumour removed, we can immediately, by percussion of the abdomen down to the level of the symphysis pubis, and by pressing the fingers back towards the spine, determine whether any tumour or solid body exists in the abdomen: or, this point being negatived, we have traced the difficulty to the pelvic cavity, and may then concentrate our attention upon the study of the causes which we know to be of pelvic origin.

The observations almost inevitably made during the passage of the catheter may alone sometimes almost settle the question. If, for example, on passing the guiding finger along the urethra we ascertain that there is no pressure upon it, and if the vaginal canal and the uterus be in normal relations, we infer that the retention is due to paralysis or other nervous disorder. If, on the other hand, we find the vagina compressed, the os uteri difficult to reach high above the symphysis pubis, and the catheter difficult to pass because the urethra and its meatus are dragged up from their normal seat, we may presume with great confidence that the case is retroversion of the gravid uterus. But to determine this point with certainty further examination is necessary. And we may usefully set before ourselves the possible conditions between which we have to decide.

To pursue this diagnostic analysis here would be to anticipate the subject-matter of future chapters.

A condition allied in nature to retention is *partial retention.* Although rarely so dangerous in its effects, death may result. The bladder is never completely emptied; and the desire to empty it is left unsatisfied, frequently inducing more or less futile straining efforts. A familiar cause of this is procidentia of the uterus. The bladder, intimately connected with the neck of the uterus, is dragged down by the uterus in its descent. A pouch is thus formed below the ordinary level of the urethra and its meatus. In this pouch urine accumulates, and the retention is apt to give rise to phosphatic and lithic concretions. This condition is easily verified by passing the sound or catheter into the urethra. The instrument passes directly downwards in front of the procident cervix uteri, and its point may be felt near the os uteri, quite outside the vulva. The worst consequences of this condition are generally averted by the variable state and degree of the uterine prolapsus. In the recumbent posture, and often during rest, the uterus rises into the pelvis, carrying the urinary pouch up with it, when the urethra comes into a position to drain it. In many cases the woman overcomes the difficulty by pushing up the procident uterus with her finger during micturition; and this is more effectual if practised in the knee-elbow posture.

Irritable Bladder.—Next to retention of urine, perhaps, the most troublesome complaint is a too frequent desire to empty the bladder. In some cases the want is irresistible and incessant. And yet there may be no disease of the bladder or kidneys. All may be due to abnormal conditions of proximate structures.

It may be stated generally that all the causes which ultimately lead to retention, commonly in their earlier stages cause irritation of the bladder, expressed by frequent desire to empty it. Hence the paramount importance of taking this symptom as a warning to institute a local physical examination. Thus I have known a woman die from the consequences of retention caused by retroflexion of the gravid uterus, who for two months previously had been attending a surgeon for irritation of the bladder, the cause not being suspected. Ordinary irritability of the bladder is distinguished from cystitis by the absence of mucus in the urine.

Cystitis, subacute or chronic, is almost sure to ensue sooner or later from partial retention of urine, just as we have seen acute congestion and inflammation ensue from complete retention. And since most of the causes of retention, partial or complete, arise externally to the bladder, we might easily fall into error if we sought exclusively in the urinary apparatus for the cause of cystitis.

Subacute cystitis arising from lesser degrees of retention or other causes—such as an irritating condition of the urine—may pass also into chronic cystitis. This is sometimes due to tubercular deposit in the urinary mucous tract. It is possible that this may exist independently of tubercular matter in the genital tract; but it is rare for the urinary tract to be affected alone. Evidence of other organs—as the lungs—being involved will seldom be wanting. Dr. West, however, thinks that inflammation of the kidneys and bladder may occur as secondary to tubercular deposit when yet no other symptom of tuberculosis is present; and, further, that such a disease may run its course to a fatal issue without phthisis supervening, even without any deposit of tubercle in the lungs or elsewhere than in the bladder and kidneys, and the absorbent glands in their immediate vicinity. I think I have seen subacute or chronic cystitis arise out of puerperal fever apart from any direct injury from severe labour or retention. It may also take its origin from exposure to cold whilst the organ is in a susceptible condition.

Chronic cystitis or irritation may arise from vesico-intestinal fistula, giving passage to portions of fæcal matter into the bladder. The case is rare, but I detected this communication in one instance by microscopic examination of some semi-solid matters passed in the urine. The case was that of a young lady who had recovered from typhoid. No doubt ulceration of the intestine had occurred, attended by peritonitic adhesion to the bladder; and thus perforation was effected into this organ, instead of the more usual escape into the cavity of the peritoneum.

In another case *fæculent matter* was frequently found in the urine. A tumour was detected in front of the uterus, and apparently between this organ and the bladder. On post-mortem examination, we found a dense mass of fibrinous substance glueing the small intestine to the fundus of the bladder. This mass had been perforated by a fistulous communication between the two organs. The cause of this appeared to be malignant disease beginning on the mucous surface of the small intestine. Blood and pus had preceded the appearance in the urine of fæces. The use of the microscope here was very manifest. Dr. Ord, to whom I gave samples of the urine, without telling him anything of the case, gave me a correct account of the food upon which the patient had been sustained.

The characteristics of chronic cystitis are usually: great irritability of the bladder, marked by frequent and urgent calls to pass urine even when there is no accumulation; the presence of mucus or pus in the urine; and pain above the pubes. Mere irritability may be due to proximate disease, as in the uterus; but where the quantity of mucus in the urine is large the mucous membrane of the bladder is affected. Local examination made by the catheter brings out pain when the point of the instrument touches the wall of the bladder, and the finger applied to the anterior roof and wall of the vagina evokes the same symptom.

The consequence of this distressing complaint is frequent spasmodic contraction and gradual thickening of the muscular coat. The bladder seems to contract upon itself; it is no longer able to hold urine enough to be distended to its normal dimensions. After a time ulceration of the mucous membrane is apt to follow; then the muco-purulent admixture is increased, blood may appear, and the irritability and pain become more severe.

The treatment consists in the employment of all those means best calculated to diminish the irritating qualities of the urine. The digestive organs will therefore demand care. Everything known to promote dyspepsia and lithiasis or oxaluria must be avoided. Demulcents and then tonics will be useful. Where lithiasis is present, alkalies, as soda, potash, or lithia, will be serviceable; but more commonly the condition to be remedied is the phosphatic, with tendency to ammoniacal urine. Here moderate doses of mineral acids and tonics will be most useful. Advantage has sometimes been gained from washing out the bladder by injecting weak acid solutions or demulcent and sedative fluids; but in some cases the irritability of the bladder is so great that this treatment is resented, and must be given up. Warm baths offer great relief when the pain or spasm is urgent.

In retention, partial or complete, it is of the utmost importance to use a male elastic catheter. The ordinary silver female catheter is quite inadequate. It may draw off a considerable quantity of urine, and yet leave the patient unrelieved. In many of these cases the bladder seems to be compressed into two loculi or pouches. You may empty one, and think your work is done. The short catheter may never have reached the more distant pouch. Now a long flexible male catheter will worm its way along a tortuous channel, and run into the furthest part of the bladder. On the principle that the greater includes the less, doing all that the lesser can do, and more, I have come to the conclusion that the male catheter should always be used. For many years I have not possessed a so-called female catheter. The flexible male catheter has the further advantage of having a longer portion protruding beyond the vulva, thus conducting the urine more easily into the receiving vessel.

Irritability of the bladder, apart from cystitis and catarrh, is a very common symptom or effect of uterine disease. Hypertrophy, congestion, and inflammation of the cervix uteri especially cause it. Malignant disease of the cervix is almost sure to produce it. It is a frequent consequence of anteversion and anteflexion of the uterus, especially if the body be much enlarged, so as to press upon the bladder. This is a familiar symptom of early pregnancy, in which condition the enlarged uterus is commonly anteverted. It may happen that the bladder-distress becomes the most troublesome effect of the uterine disorder, so that attention is concentrated upon it to the neglect of the primary condition.

Inflammation of the uterus not seldom entails, through the disturbance it causes in the digestive function, an altered condition of the urine. Thus we see an excess of phosphates and lithates and mucus, and the irritation attending the abnormal character of the urine aggravates the local suffering from the disease of the uterus.

It may also cause irritation of the bladder, manifested in incontinence and dysuria by mere contiguity, just as inflamed hæmorrhoids in the male may irritate the contiguous bladder. This is further illustrated by the increased dysuria, sometimes amounting to partial retention, which occurs at the menstrual periods.

Incontinence of urine may be due to a fistulous communication between the bladder and the vagina. This is usually discovered some days, perhaps a week or a fortnight, after labour. The opening is rarely made immediately by direct force, but is established gradually as the result of necrosis and sloughing of the part which was subjected to greatest pressure. This process takes some days to be completed. It not seldom attends cancer, being due either to perforation of the bladder or to loss of sphincter-power from extension of the disease.

But incontinence may be the result of disease of the nervous centres. Thus I have been consulted in a case of incontinence where it was suspected that a fistula existed, but the infirmity was really due to progressive general paralysis. Of course, in advanced cases of paralysis, other nervous symptoms are so predominant that the bladder infirmity is readily referred to its true cause. But the interesting point in relation to our present theme is that the bladder infirmity may be the earliest symptom to attract attention, and then it is likely to mislead.

Dysuria.—Painful micturition is frequently a symptom of bladder or urethral disease. It is pretty sure to attend the vascular excrescence of the meatus urinarius; and the presence of this condition is rendered more probable if a little blood attends micturition. Dysuria again may be due to urethritis, simple or gonorrhœal, or syphilitic. If attended by copious muco-purulent discharge, specific infection may be suspected. In rare instances stricture of the urethra may be the cause. In instances also rare the cause may be calculus in the bladder or urethra. In any case persistent dysuria is an indication for local exploration of the pelvic organs.

Abnormal excretions from the bladder are usually more characteristic of functional disorder or disease of the nutritive organs of the kidney or bladder than of retention, irritability, or incontinence. But we should often be led astray if we assumed that this was universally the case.

Hæmaturia.—Thus, blood in the urine may be symptomatic of calculus in the kidney, or of malignant disease of the bladder; but it may be simply a form of vicarious menstruation. *Blood* in the urine, again, may accompany albuminuria induced by pregnancy, as I saw in a case at the London Hospital. She applied on account of hæmaturia; when this intermitted we found albuminuria. There was dropsy throughout.

Not seldom blood mixed with the urine may be traced to a vascular tumour of the meatus urinarius, or to a vascular state of the urethra. And I have seen cases of bloody urine that passed for hæmaturia until a cancerous fistula was discovered. The urine escaped into the vagina, where it became mixed with blood from the cancerous ulceration.

Pus, again, may denote disease of the kidney or bladder; but it may find its way into the bladder from the most singular and unsuspected sources. Thus I have under care with Dr. Crisp a case, in which, for many years, large quantities of pus are occasionally passed in the urine. The source of the pus is not the bladder. It finds its way into the bladder from a dermoid cyst, which has made for itself another opening near the umbilicus. Pus frequently comes from this external opening. A probe passed into it finds its way into a cavity downwards for a distance of four or five inches, whilst another sound passed into the bladder runs up an equal distance, so far, indeed, that the points of the two instruments cross each other. Although they do not touch, there can be no doubt that both run into the same cavity. It is remarkable how in this case the bladder retains its healthy state, notwithstanding the irritation it is subjected to. The day after passing a large quantity of pus, clear urine is voided, and irritation subsides.

Hair, fat, teeth, may find their way into the bladder and urine. They afford conclusive evidence that a dermoid cyst has contracted adhesions with the bladder and established a fistulous communication. *Bones of fœtal character* may arise from an extra-uterine gestation-cyst. In these cases, signs of dysuria, of incontinence, of irritability of the bladder, perhaps the appearance of blood or pus, will have preceded the discharge of the hair, fat, teeth, or bones. And in most cases the tumour whence these matters proceeded may be made out by careful vaginal, rectal, and abdominal palpation, aided by the sound.

The most unequivocal indications of disease of the kidneys or bladder are the alterations in the chemical qualities of the urine. Thus, *excess of phosphates or lithates,* or the presence of *albumen,* of *sugar,* of *oxalic acid,* point to disorder of the nutritive functions. It must not, however, be forgotten that these conditions are sometimes secondary upon conditions of the ovaries and uterus. For example, metritis, acute or chronic, frequently induces such a disturbance in nutrition that phosphates and lithates appear in superabundance in the urine. So mucus and pus may follow an acute or chronic cystitis ensuing upon retention of urine from any of the causes we have discussed. And albuminuria may sometimes be traced back to pregnancy, even in cases where eclampsia was not manifested. The excretion of sugar also may have begun under the influence of pregnancy. It is true that albumen and sugar usually disappear from the urine soon after pregnancy has been brought to a term, but occasionally the morbid process, once started, persists after the cessation of the original cause. Bearing in mind this association of albuminuria, sugar, and pregnancy, we should not omit, when these abnormal ingredients are found in the urine, to institute a careful examination to determine the presence or absence of pregnancy.

Primary malignant disease of the bladder is very rare in women. Dr. West relates one observation so complete that I am induced to quote it in lieu of giving an abstract description of the affection. A woman, aged sixty-two, had suffered for a year previously from pain in the region of the bladder, aggravated after passing water, the calls to which became more frequent than natural, while at the same time her urine grew turbid, and deposited a thick sediment. Blood now frequently appeared in her urine; sometimes in small quantities, sometimes in clots, and once in very large quantity. She had of late suffered from pain in the back. A surgeon introduced a catheter, which was followed by considerable hæmorrhage, which lasted for several days, and was apparently stopped by gallic acid. On admission the pulse was 80, soft. No tumour was perceptible in the abdomen, but firm pressure immediately over the pubes caused some pain. The uterus was high up, small, healthy. In front of the uterus, pushing it into the posterior half of the pelvis, was a firm, somewhat irregular growth, reaching from the anterior half of the pelvis in the situation of the bladder. This growth was perfectly immovable. It seemed to be connected with the pelvic walls; was somewhat tender on pressure. It occupied the whole anterior half of the pelvic brim, though not dipping much into the cavity. The urine was pale, alkaline, depositing ropy mucus, and showing crystals of triple phosphate and cells of nucleated epithelium. Shortly afterwards the woman met with an accident, and died of erysipelas. The uterus and vagina were found perfectly healthy; but the whole posterior half of the bladder was occupied by a medullary growth, with an irregular surface, which projected into the cavity of the organ, its substance being in part firm, in part almost semi-fluid. The anterior half of the bladder was quite healthy, as was also the substance of both kidneys, except that the right ureter, being involved in the diseased mass, was dilated to three or four times its natural size, and the infundibulum of the right kidney was enormously enlarged.

In this case the distinctive character of malignancy was the hæmorrhage. The tumour felt in front of the uterus might be due to a blood-mass in the cellular tissue connecting the uterus and bladder, or in the vesico-uterine peritoneal pouch. The profuse bleeding also distinguishes the disease from the other causes of *hæmaturia.* These are:—1. *A calculus.* In this case the blood is seldom more than a few drops, and the catheter will detect the stone. 2. *Foreign bodies.* The most inconceivable things have found their way into the bladder; hair-pins, for example. These give rise to cystitis; phosphatic deposits collect around the foreign body. The sound will detect these as well. 3. The hæmorrhage may be *vicarious of menstruation.* Here the quantity is not so great as in malignant disease; it occurs in comparatively early life, and the menstrual irregularity is marked by other symptoms.

Secondary malignant disease of the bladder is unfortunately too common. It arises mostly as an extension from cancerous disease of the cervix uteri. The invasion of the bladder is then marked by cystitis, but this symptom, although adding much to the patient's distress, is now but of subsidiary importance. Often the bladder is perforated from without by the advancing necrotic or ulcerative process, so that the urine escapes involuntarily. But this symptom, Kiwisch rightly observes, when occurring in the course of cancer of the uterus, is not to be regarded as certain evidence of perforation of the bladder, for this symptom is frequently only the consequence of carcinomatous infiltration of the neck of the bladder, and especially of that part corresponding to the sphincter, by which it is hindered in the performance of its functions, and thus permits the urine to run off.

Opium in some form or other is indispensable in the treatment. It may be given by the mouth, by vaginal pessary, by rectal suppository, or by subcutaneous injection.

SIGNIFICANCE OF SYMPTOMS CONNECTED WITH RECTUM AND OTHER BOWEL-DISORDERS IN RELATION TO UTERINE AND PERI-UTERINE AFFECTIONS.

Although the uterus is not in such intimate relation to the rectum as it is to the bladder, it is still so close to it in position that disorder or distress referred to the rectum is an extremely frequent complication of uterine disease or displacement. The unity of the pelvic vascular system is such that engorgement or inflammation of the uterus cannot fail to cause increased afflux of blood and hæmostasis in the other pelvic organs. To this increased flow of blood, determined by inflammation or congestion of the uterus, there is necessarily added the mechanical effect of increased weight and bulk. Thus two conditions already combine to cause accumulation of blood in the hæmorrhoidal vessels. A third condition is rarely wanting long. This is displacement of the uterus. The prolapsus consequent upon increased weight of the uterus, and the relaxation of its supporting structures bring a further aggravation of pressure to bear upon the rectum just above the anus, increasing the difficulty under which the hæmorrhoidal vessels labour in unloading themselves.

To these mechanical influences in producing local vascular stagnation other remote and secondary causes bring a contingent of trouble. The gradual impairment of digestion and other nutritive functions, the enforced inactivity, consequent on uterine disease, entail constipation and loss of sphincteric tone. Hence the disposition of the hæmorrhoidal vessels to dilate, to become varicose, and to favour the formation of piles and thrombi, is enforced in a variety of concurrent ways.

The foundation of rectal and anal distress is often laid in pregnancy. The active developmental nisus, bringing to the pelvic vessels a large quantity of blood, leads to distension, to venectasis, which does not always subside after labour. The dilatation of the vascular plexuses around the lower part of the vagina and vulva arising during pregnancy is also found around the anus. During labour the extreme compression to which this part is subjected may retard the circulation in the vessels for several hours, and then, during the final act of expulsion, the tissues in which the vessels are embedded, being inordinately stretched, perhaps even lacerated, the vessels themselves undergo serious injury, from which they may never recover. At this stage there is often absolute eversion of the lower part of the bowel; the mucous membrane is exposed, swollen and livid from intense congestion; and sphincteric power is more or less impaired. I believe that in some cases fibres of the sphincter are ruptured without rupture of the mucous or cutaneous investments; there is, in fact, subcutaneous or submucous division of the muscle. It is only in this way that we can explain the lax and half-open state of the anus so often observed in women who have borne children.

Pregnancy and labour form the frequent starting-point of hæmorrhoids in women. But menstruation, a mimic parturition, if difficult or complicated by constipation and other troubles of nutrition and circulation, not seldom entails the like condition. The same act of distension, whilst the parts are turgid with blood, sometimes causes small lacerations of the edge of the anus, which, not healing, become fissures or ulcers. In some cases, again, the sphincter is found to have lost something of its contractile power. This loss is complete, or nearly so, when the sphincter has been torn through, as in many cases of laceration of the perineum. In these cases, the want of power to retain the fæces—incontinence,—observed after labour, is usually enough to suggest the true nature of the case, and, examination being made, the injury is revealed. In whatever way these lesions may have arisen, they are apt to be kept up by uterine disease, the two conditions exerting a mutual vicious influence. On the other hand, hæmorrhoids, fissures, and ulcers of the rectum and anus may be primary, or at least exist independently of uterine disease or displacement. The symptoms they give rise to may be taken by the patient, and in the first instance by the medical attendant, as evidence of uterine disease. And disease of the rectum, if involving much congestion and pain and difficulty in the performance of its function by the consequent accumulations and straining, may induce congestion and prolapse of the uterus. Here, as in the converse case, the morbid condition of each organ exerts a vicious influence upon the other.

The displacements of the uterus almost always induce some rectal complication. In prolapsus simple, or with the usual attendant retroversion, the uterus falls into the lower part of the sacral hollow, and therefore projects more or less into the anterior wall of the rectum. It induces some degree of obstruction, to overcome which increased bearing-down efforts are excited. This increases the evil. The progressive prolapsus causing inversion of the vagina, the recto-uterine peritoneal pouch is dragged down, and then the anterior wall of the rectum is drawn into a pouch, constituting vaginal rectocele. It is a matter of observation that the reduction of the displacement is frequently followed by the return of healthy peristaltic action.

In anteversion, the vaginal portion of the uterus is tilted up and back, so as to form a conical projection into the rectal cavity, easily felt by rectal digital touch. If, as often happens, the vaginal portion is congested or inflamed, exquisite pain is experienced when a stool has been passed. In some cases this pain on defecation is felt only, or at least is felt with especial severity, at the menstrual epochs.

In retroversion and retroflexion the body of the uterus, most probably enlarged and painful, presses into the anterior wall of the rectum, encroaching upon its calibre, acting as a ball-valve, causing a degree of obstruction, paralysis, dyschezia, and retrograde or ascending disorder of the intestinal canal. Sometimes, in retroversion of the gravid womb, the strain upon the rectum is so great that actual tenesmus is induced. But often where there is no uterine disease, the reflex forcing due to disease of the rectum or anus will simulate uterine displacement or disease; and what is important to remember, may ultimately induce it.

The diagnosis of rectal from uterine or vaginal disease can be made by direct examination. Symptoms such as pain on defæcation, pain when the sphincter acts, discharges of mucus or blood from the anus, will of course point to the seat of disease. But direct inspection is necessary to determine not only what is the exact morbid condition, but also what is to be done. Rectal exploration as a means of making a correct diagnosis of uterine disease is often indispensable. Thus in the course of examining for uterine disease we often discover rectal complications. But apart from this incidental exploration, when symptoms referred to the anus are complained of, special examinationof this part should be made. I have several times in this way detected a fistula which had not been suspected by the patient. The rectum and anus may be examined, first, by the touch. The finger, oiled, is passed into the rectum and made to explore the cavity as far as it will fairly reach. In this way a polypus may be felt, or any tumour or constriction in the cavity; and we may judge how far the intrusion of the displaced uterus may be a cause of distress. Secondly, we may bring the lower edge of the rectum inside the sphincter into view by the following manœuvre; pass the forefinger, having well pared down its nail, into the vagina above the perineum, so as to get its tip as fairly over the seat of the anus as possible; then by depressing this strongly the lower part of the rectum is everted and made to protrude through the anus. In this way hæmorrhoids, fissures, or ulcers, and the state of the mucous membrane, can be seen. Or, thirdly, the anal speculum may be used. By this aid we obtain inspection of the mucous membrane higher up, and can see a polypus or other morbid condition that may exist.

It is almost superfluous to say that constant irritation of the bowels, and especially the loss of power to retain the motions, is motive enough for suspecting the existence of laceration of the sphincter and perineum. It may indeed indicate general paralysis. In this case, however, other signs of nervous disease will probably be detected. But incontinence of urine and fæces may be the earliest manifestation. Thus I have had a patient brought to me principally on this account, the grave disease of the nervous centres being not yet suspected by the patient or her friends.

Diarrhœa is frequent at the menstrual epochs, due no doubt to the increased irritation of the mucous membrane and the hyperæmia induced.

If we follow in a similar order to that observed in the case of the bladder, we shall first study the significance of *retention of fæces.* This will lead to the investigation of the causes of *obstruction.* Now, the need of defæcation is far less imperious than that of micturition. If the bladder is not relieved within twenty-four hours such urgent distress ensues as to compel attention. But accumulation may go on in the bowel for many days. There is a further difference. If we except the case of strangulated hernia, it is comparatively rare for complete obstruction of the bowel to come on suddenly, as does obstruction of the urethra. These two conditions render the approach and existence of bowel-obstruction more insidious and more difficult to realize. In the majority of cases bowel-obstruction from pelvic disease comes on very gradually. As the obstruction increases, defæcation is more and more difficult and scanty. Retrograde dilatation of the intestine above the obstruction takes place, which, by giving more room for the lodgment of fæces, affords some compensation for the want of outlet; the absorption of the watery constituent of the fæces, and the more scanty food taken, further tend to postpone the climax and to prolong the delusion that we have to deal simply with obstinate constipation. The climax is at length determined by the distension of the belly—partly by flatus, partly by fæces; by the abdominal pain; by the sense of distress that never fails to attend the non-fulfilment of a necessary function; perhaps vomiting; surely loss of appetite; earthy, dirty, yellow tinge of skin, due to empoisonment from absorption of fæcal elements and bile—a condition analogous to urinæmia, and for which I have proposed the name "copræmia;" and by the failure of purgatives and enemata to bring away fæcal matter. When things have come to this pass, a strict examination is imperative. If exploration of the abdomen discover no sufficient cause, we must explore the pelvis. This is done by the vagina and rectum. The instruments needed are the finger, the sound or a whalebone probang, the aspirator-trocar, and the enema-syringe.

I once saw retention of urine in an old woman caused by a compacted mass of fæces in the rectum; it filled the hollow of the sacrum and pushed the uterus forwards against the symphysis pubis, turning the vagina forwards in much the same manner as retro-uterine hæmatocele. The mass yielded like putty before the finger; the indentations made remained; there was no elasticity in it; and the finger in the rectum became embedded in the mass. Copious enemata washed away the tumour and relieved the bladder.

Retention may be incomplete or complete. The retention caused by retroversion of the gravid womb is rarely complete; and the distress arising being of quite minor importance to the attendant retention of urine, the subject need not detain us. But there are cases of incomplete fæcal retention caused by retroflexion of the enlarged uterus in which there may be no serious retention of urine. In these cases the enlarged body of the uterus, rolled back into the sacral hollow, compresses the anterior wall of the rectum against the posterior wall, acting like a ball-valve. To some degree this difficulty and its retrograde consequences attend most cases of retroversion or retroflexion of the uterus. It is sometimes more pronounced when there is impaction of the uterus enlarged by fibroid tumours. Examination by vagina and rectum will reveal the true nature of the obstruction; the uterine sound will lift the mass out of its false position, and then a suitable pessary will keep it from falling back. Thus complete relief to the bowel is often attained. Obstruction from pelvic cellulitis or peritonitis is diagnosed by the signs described under this head. But something more is required. The patient under chloroform, the finger is passed as high as possible into the rectum, and, following its course, we come to the constriction caused by the fibrinous deposit nearly encircling the bowel, and nearly closing it by concentric contraction. I saw a case in which things had gone to such extremes that death seemed imminent. The stricture admitted barely a bougie. The pelvic brim was occupied by a dense mass matting all the organs together. It was difficult to decide whether this was due to malignant disease or to simple inflammatory effusion. I suggested as the only apparent prospect of relief the resort to colotomy. Whilst this was being debated, suddenly an immense gush of pus took place, the bowel was liberated, and recovery ensued. Such a lesson could not be forgotten. In several cases which have since come under my care I have penetrated the mass by the aspirator-trocar, and have thus drawn off pus with manifest relief. The marks of irritative fever will aid in raising the suspicion of imprisoned pus. But this kind of evidence is not wanted to justify the puncture. The operation, as far as I may judge from a considerable number of observations, is quite harmless, and its value in diagnosis and treatment is so great that I think it should be resorted to in every instance where local or systemic distress is manifest. I have even seen reason to believe that punctures thus made for diagnostic purposes have had a curative action by stimulating absorption of the effused material.

It is necessary to be provided with special trocars. The ordinary ones supplied are not available for intra-pelvic use. Messrs. Weiss have made for me trocars eight or nine inches long, supported on a firm stem, which answer well. They can be adapted, like the ordinary needles, to the same mount of the aspirator-tube.

Another disease which may proceed in a similar manner, and lead up to the same result, is cancer. Whenever this dire disease invades the mucous outlets or canals, it tends to close them by gradual concentric contraction. We see this in the œsophagus, in the anus, the vagina, and the urethra. So when it extends from the uterus, invading the neighbouring structures, it not seldom seizes the rectum about the sigmoid flexure, surrounds it, and, gradually closing in, the tube is reduced to the smallest bore, so small as to be quite inadequate to the function of defæcation. In this way cancer occasionally proves fatal. All the signs of copræmia and starvation precede. In such a case the only hope of reprieve lies in colotomy. We may puncture by the aspirator-trocar, but nothing beyond diagnostic satisfaction will be gained.

Ovarian tumours have caused death by obstructing the bowel. Dr. Parker* relates a case. Rokitansky describes fatal constriction caused by the rotation of an ovarian tumour. When symptoms of dangerous bowel-obstruction supervene in connection with ovarian tumour the expediency of immediately proceeding to extirpation must be earnestly discussed. The same rule will apply to closure from a locked fibroid tumour. A muscular tube depends for its healthy work on the freedom of its muscular action. This action is liable to be arrested or paralyzed if the tube be encroached upon by inflammatory or other deposit in such a manner as to interfere with its mobility, or to lessen its calibre. Nay, the mere proximity to an inflamed or enlarged organ seems often to be enough. Whenever a function can only be exercised at the cost of pain, the system instinctively tries to avoid pain by suppressing the function. And there may be other causes of nervous diversion leading to this induced local paralysis.

Dyschezia (from δὺσ- and χέζω).—Difficult or painful defæcation may be due to hæmorrhoids, fissure, or excessively vascular condition of the anus. If blood follow the stool rather copiously, whether of arterial or venous character, we may suspect hæmorrhoids. If the pain is more acute, and the quantity of blood small, the probability is in favour of fissure. But these conditions can neither be verified nor successfully treated without examination.

As in the case of the bladder, so in that of the bowel, we have to consider the significance of *abnormal matters in the excretion.* In both cases these may or may not be indications of disease of the organ from which they flow. Thus, *blood, mucus, pus,* may be the manifestations of dysentery and ulceration of the intestine or of hæmorrhoids. But they may spring from quite different causes. For instance, blood in considerable quantity is sometimes discharged under the exalted vascular tension of pregnancy, or of menstruation; or it may be due to a polypus in the rectum. Whenever blood comes from the bowel apart from the obvious conditions of fever, dysentery, or liver disease, the possibility of pregnancy should be considered, and the pelvic portion of the bowel, with its relations, should be carefully examined.

Blood may come from a pelvic hæmatocele. It may issue from a dermoid or cystoid tumour. So may *pus, hair,* or *bones,* or *teeth.* Indeed, the rectum is the often elected channel for the voidance of the contents of most of the pelvic tumours. Abscesses resulting from pelvic inflammations most frequently empty themselves by this road; and this is also the favourite channel for the elimination of the *fœtal elements* of extra-uterine gestation cysts. Intra-pelvic examination is essential for the recognition or the exclusion of these conditions. And this examination must be thorough. In urgent cases it may even be necessary to pass the whole hand into the rectum—of course whilst the patient is in a state of anæsthesia.

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* "Edinburgh Medical Journal," 1863.

One lesson will be drawn from the clinical deductions made in these studies of the relations of bladder and bowel distress to disease of the neighbouring structures. It will be seen how impossible it is to pretermit close examination of the surrounding organs without serious risk of overlooking conditions that may be fatal if neglected, and which may be remedied if discovered. Whilst we are looking at the kidneys or the intestine, because they are disturbed in their functions, it may be the uterus or the ovaries that are in fault. We thus see how dangerous it is to practise in the spirit of pure specialism; how absurd it is to map out the body, and assign particular territories to particular classes of practitioners. It will be seen how intimately, how indissolubly that part of medicine which takes for its basis the particular study of the generative system in woman, is linked with the disorders of the alimentary, vascular, and nervous systems; that is, a pure specialty cannot exist. A more monstrous thing cannot be conceived.

CHAPTER IV.

THE INSTRUMENTS SERVING FOR DIAGNOSIS AND TREATMENT.

Having taken a cursory survey of the principal symptoms, chiefly subjective, attending ovarian, uterine, and vaginal disease, the methods of investigation by which we bring out the objective signs and seek to establish a full diagnosis might now be described. But as the means to be employed in this investigation involve the use of instruments, I have thought this would be the most convenient place to introduce a description of the instruments employed and the mode of using them. Having become acquainted with our tools, and knowing what they can do, we shall then be in a better position to proceed to diagnostic analysis.

THE GYNÆCOLOGIST'S ARMAMENTARIUM.

It will serve the purpose of order and conciseness if we gather into one view the chief instruments and materials employed in the diagnosis and treatment of the diseases of women. Independently of reasons of economy and method for collecting all these things into one compact portable case, stands the great practical fact that, when about to investigate a case of presumed ovarian, uterine, or vaginal disease, we cannot tell what instruments we may want to carry out the indications in diagnosis and treatment which may present themselves. For example, all local examination necessarily begins with the digital touch. This may be sufficient, but often it gives information which is imperfect, and which requires to be followed out by the speculum or sound; and when we have got the full diagnostic knowledge which finger, speculum, and sound can give, it frequently happens that we are immediately in a position to apply an appropriate remedy. Thus diagnosis is made the true handmaid of treatment. The patient is often spared the double distress of two separate examinations. It is in this quality that lies the highest recommendation of the diagnostic instruments we employ; it is this quality which invests them with a practical superiority over most of the instruments employed in the investigation of diseases of other parts of the body. The stethoscope, for example, an instrument invaluable, but not absolutely indispensable, for diagnosis, and thus helping to form a scheme of treatment, is of no use in carrying out the treatment. Like the sphygmograph or the thermometer, it is purely an instrument of observation.

It would appear to be a natural classification of our appliances to divide them into diagnostic and therapeutical. Rigorous adherence to this is defeated by the double quality which some of the instruments possess. But still this division is rational and convenient.

It is not, perhaps, superfluous to preface the enumeration and description of instruments by recalling attention to the hand and eye of the physician. The eye, of course, is simply an instrument of observation; its application is often only possible when aided by other instruments, as for instance, the speculum; and in a great many cases it is not wanted either for diagnosis or treatment. But the hand is pre-eminently the obstetric instrument; it possesses a wide diagnostic and therapeutical range of usefulness; it is not only in itself competent to the detection of many morbid conditions, and to the treatment of some, but it is also an indispensable element in the use of other instruments.

The *Diagnostic Instruments* are:

- The speculum.
- The endoscope.
- The speculum-forceps.
- The uterine sound.
- A flexible whalebone sound.
- The sponge or laminaria-tent.
- Dieulafoy's aspirator with special trocars.
- A bit of wax-candle, or small reflecting candle-lamp for speculum examinations and operations in dark weather or unfavourable positions of the patient.

The *Therapeutical Instruments* are:

- The uterine sound.
- The catheter.
- The speculum-forceps.
- Simpson's metrotome-knife.
- The metrotome-scissors.
- Sims's single tenaculum-hook to hold the vaginal-portion.
- A wire-écraseur.
- The intra-uterine solid caustic-carrier.
- „ „ fluid and ointment-carrier.
- The tube for carrying sticks of sulphate of zinc, or other substances, into the uterus.

Barnes's laminaria-tent carrier.
A scarificator.
An intra-uterine injecting apparatus.
A probang mounted with sponge.
A syringe for washing out the vagina or uterus.
A subcutaneous injecting syringe, to which may be adapted a long hollow needle to draw off fluid from a tumour for microscopical and chemical analysis.
An aspirator-apparatus with special long needles for penetrating tumours by rectum or vagina. To explore and tap retro-uterine tumours, I have designed a very efficient trocar consisting of a tube twelve inches long, carrying a fine blade which serves both to puncture, and if needs be to extend the opening; the knife withdrawn a coil-drainage tube can then be carried through the tube into the cyst.

The most useful *Materia Medica* are:

Perchloride of iron (solid).
Chloroform or ether.
Chromic acid, in crystals.
Richardson's styptic colloid.
Bromine of caustic power.
Carbolic acid.
Nitric acid is often wanted, but it cannot be carried or packed with other things, unless in hermetically sealed tubes.
Tincture of iodine.
Acetic acid, concentrated.
Nitrate of silver.
Sticks of potassa cum calce.
Sticks of sulphate of zinc.
Iodide of mercury ointment.
Medicinal pessaries: 1. Perchloride of iron pessaries.
2. Belladonna.
3. Morphia.
4. Gallic acid.
5. Iodide of lead.

The following articles should also be at hand:

Cotton-wool, plain and prepared with styptics and disinfectants.
String, silk, lint.
Needles, half-curved, carrying silver wire.
Forceps for holding needles.
A small collection of pessaries. (The most useful are three sizes of Hodge's lever-pessaries.)
Thomas's or Galabin's pessaries for anteversion.

One or two of the author's intra-uterine galvanic pessaries.
A vulcanite intra-uterine pessary.
A Sims's or Barnes's vaginal rest.
A Gariel's or other air pessary.

The pessaries will be described in a succeeding chapter.

The stethoscope and thermometer are, of course, the constant companions of every medical practitioner.

In addition to the knives, scissors, forceps, &c., required for special operations, it will be useful to possess a galvano-cautery, and a Paquelin's thermo-cautery. The galvano-cautery, of which the most convenient form is Mathieu's of Paris, is cumbersome, and troublesome to work; but it does what Paquelin's ingenious instrument will not do, and therefore cannot be dispensed with.

Instruments for use by patients:
Higginson's vaginal syringe.
Barnes's speculum for self-application of vaginal pessaries, and wool carrying solutions of lead, bromine, &c.

The special requirements of particular cases, or the views of the practitioner, will suggest further or different things to make up the equipment. My object is to enumerate those which are the most generally useful. A selection of the above, especially including the diagnostic instruments, should be kept in a suitable hand-bag or case.

Some of the articles require a more particular description. To take first the *speculum*. Specula may be classed under three heads according to their mode of action:

1. *Tubular*, which act by distending the vagina longitudinally thus lengthening the vagina and pushing the uterus away before it.

2. *Valvular*, which distend the fundus of the vagina, thus widening and shortening the vagina, and bringing the uterus lower and nearer to the vulva.

3. The single *duck-bill*, which acts by retracting the perineum and posterior wall of the vagina.

In private practice, the most generally useful speculum is that known as *Fergusson's* glass tubular instrument, silvered and coated with vulcanite (Fig. 39). The light this gives is superior to that which any other form of speculum can give; and this is an advantage of primary importance, for we cannot always in the houses of patients command a good, direct horizontal light. Two sizes should be kept: one of comparatively large size for women who have had children, and one of small calibre for others. Both should be six or seven inches long, otherwise the vagina may not be distended enough to bring the os uteri into view.

The tubular speculum has the disadvantage that, when introduced its full length, it possesses no power of increasing the distension of the fundus of the vagina, so as to bring out the vaginal-portion from behind overlapping folds of a lax vagina; therefore, unless an instrument of adequate size be used, it may fail to exhibit the os uteri.

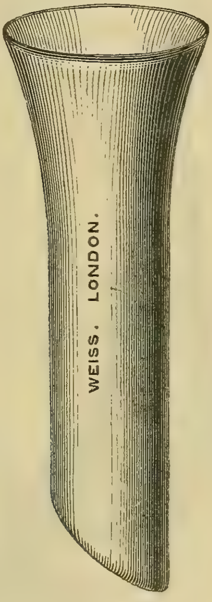

Fig. 39.—(Half natural size.)

FERGUSSON'S SPECULUM.

A serious objection to Fergusson's speculum is its liability to break. All its advantages are secured, without this drawback, in an instrument of the same shape made of metal plated with nickel.

Plain glass specula are, however, useful; and if made of "*verre trempé*" would resist ordinary risk of breakage. They possess the advantage of being cleanly beyond suspicion. The German "*milch-glass* speculum" has equivalent merits.

Good valvular specula overcome the difficulty inherent to the tubular. Being introduced their full length in a closed state, the blades can be opened at their extreme points so as to stretch out the folds at the roof of the vagina, and thus bring the os uteri well into the field, without increasing the distension at the vulva. As the uterine ends of the blades expand, it is not only more easy to bring the vaginal-portion into the field, but by continuing the expansion, the roof of the vagina is put on the stretch, and thus pulls open the os uteri, exposing often a considerable part of the cavity of the cervix, and thereby much facilitating the direct application of remedies.

For many years I used a modification of Henry Bennet's bivalve speculum. It is an excellent instrument, but I have been led to prefer for general use *Cusco's* speculum (Fig. 40). The wooden plug, an objectionable complication of most other bivalves, is got rid of. The blades are wide and nearly flat, so that, when brought together, they touch along the whole extent of their margins, and represent a wedge with smooth edges. This makes the plug superfluous. It is not, however, quite so easy to introduce; some care is requisite to keep off the rather narrow edge from the os pubis. When introduced, the screw at the handle expands the blades at the uterine end, and distends the vaginal roof in a very efficient manner. This instrument is in many cases self-retaining. It is virtually a double duck-bill speculum. I have found it useful to increase by an inch or more the part in which the screw is worked at the handle. This takes the hand clear of the range of vision, and the screw from entangling the pubic hair.

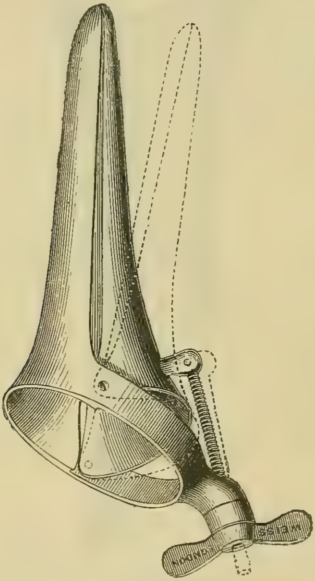

Fig. 40.—(Half size.)

CUSCO'S SPECULUM.

Marion Sims's Single Duck-bill or Spoon Speculum (*Fig.* 41).—This is a most serviceable instrument. It is almost indispensable in the performance of protracted operations, such as the closure of vaginal fistulæ. It is not, however, so convenient for ordinary practice. In many cases an additional instrument to serve as a retractor to hold back the anterior vaginal wall is required; and this makes an assistant necessary. It is, moreover, only available in the semi-prone position, or in the lithotomy position, neither of which is it always easy to obtain in private practice. It is convenient to have it made the two blades united by a screw, so that the blade serving as a handle may be made to turn either way.

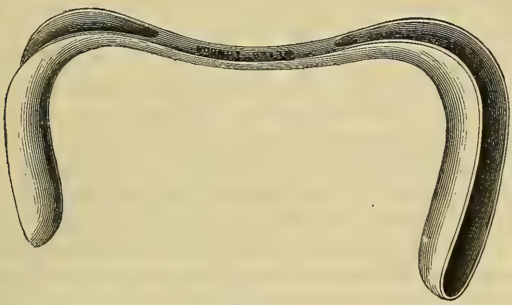

FIG. 41.
SIMS'S SPECULUM.

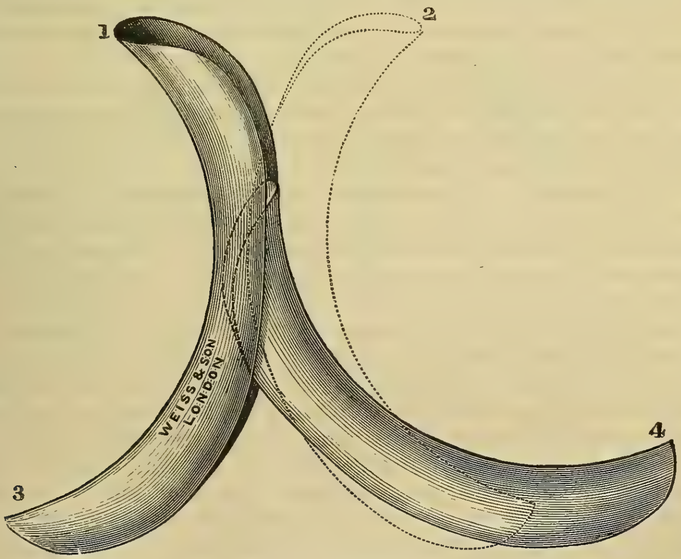

FIG. 42.—(Half size.)
BARNES'S SPECULUM (R. B.).

The Author's Bivalve Speculum. "Crescent Speculum."—There is no speculum with which I am acquainted so useful for facilitating operations upon the vaginal-portion as the modification of Neugebauer's, which I have designed (Fig. 42). In many cases this instrument is sufficiently self-retaining to afford the manipulator the opportunity of applying remedies to, or even of performing operations upon, the cervix uteri without assistance. It gives freer space for operative manipulation than any other speculum. It brings the os uteri so near that it is commonly easy to reach it by finger.

The tubular and valvular specula afford a perfect inspection of the whole tract of the vagina and vulva. The time for making this inspection is during the withdrawal of the instrument. As this is slowly done, the vaginal walls close in upon the retreating speculum, and come successively within its field. Except in very extreme cases of relaxation, the contractility and resilience of the vagina are powerful enough to aid in expelling the speculum.

Weiss's Self-retaining Duck-bill Speculum.—This instrument is the adaptation of an apparatus for fixing a duck-bill or Sims's spoon-blade in the vagina, so as to dispense with the use of hands to hold it *in sitû.* In this way many operations may be conveniently carried out without assistants. I have used it, and find that it answers its purpose.

All the above-described specula, excepting Fergusson's, should be plated with nickel. This gives a beautifully smooth surface, which resists the action of many of the corroding agents employed, and is easily kept bright.

The Endoscope.—In connection with the speculum, it is proper to refer to the endoscope, which may be defined as a prolongation or extension of the ordinary speculum. The design of the uterine endoscope is to enable the surgeon to see beyond the os uteri externum into the cavity of the cervix, and even into the cavity of the body of the uterus. Several ingenious instruments have been contrived for this purpose. One, that of Jobert, consists virtually of a small two-bladed speculum, capable of being introduced closed into the cervix uteri. The two blades being mounted on a long stem, are, after introduction, made to diverge by working a screw in the handle. It resembles in principle and action Weiss's urethra-dilator. Another contrivance that may be mentioned is that of Tyler Smith.* This instrument is applied through a modified Cusco's speculum. It consists of a mirror and a cylindrical tube, both provided with long handles. By means of a screw, the mirror can be inclined at any angle, so as to receive and transmit a ray of light through the tube which is passed into the uterine cavity. Another form of endoscope is adapted for intra-rectal inspection.

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* Obstetrical Society's Catalogue of Instruments, 1867.

The *uterine sound* is an instrument designed on the principle of the sound made to explore the male bladder. It is a special form of the surgical probe. The probe indeed, or some form of it, has long been used to facilitate the exploration of the uterus. Its application to the diagnosis of polypus from inversion of the uterus is described in the early editions of Samuel Cooper's *Surgical Dictionary*. Huguier says the uterine sound was known to Hippocrates. Harvey relates a case in which he used an equivalent instrument for the express purpose of exploring the cavity of the uterus. But still the application of the sound to uterine examination, an application which would seem to flow so naturally from the familiar use of the instrument in investigating the condition of the bladder, remained in abeyance until it was revived by Lair, who described a uterine sound in 1828.* The late Sir James Simpson, in 1843, made known his conclusions upon the mode of examining by help of a uterine sound or bougie, and described the form of instrument he recommended. His instrument is the one which I have selected for illustration in this work. It is the one which I most frequently employ. It is provided, like the common male sound, with a flat handle to facilitate manipulation, and terminates at its other extremity in a rounded knob or bulb, which enables it to ride more easily over the rugæ of the cervical canal, and lessens the risk of injuring the uterus. The stem tapers gradually from the handle to the knob, the thickest part being equal in calibre to a No. 8 catheter, the portion near the knob being equal to a No. 3 catheter. The exploring half of the sound should be made of silver only moderately alloyed with copper, so as to permit of its being readily bent by the fingers. Some are made with virgin silver. This is too flexible, as it is apt to bend during use, especially in cases of flexion of the uterus. The stem is about ten inches long, and is graduated so as to indicate the depth to which it may penetrate. The graduation is marked in the figure. (Fig. 43.) There is one principal mark which is the most essential as a standard of comparison, made by an elbow or projection, just 2½ inches from the knob. This marks the normal length of the uterine cavity. When the sound has been introduced as far as this, resistance is commonly felt, and we know, by feeling the elbow on a level with the os externum uteri, that the knob is 2½ inches in the uterus. It is useful to have a mark between the elbow and the knob half an inch above the elbow. This is useful in giving precise measurement where the knob will not go the full distance. Below the knob the stem is graduated by inches. These secondary marks are best made by slight notches. There are different ways of making the index-marks; but as

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* "Nouvelle Méthode de Traitement des Ulcères de l'Utérus." Paris, 1828.

Simpson rightly insists, the marks should be so made as to be readily felt by the finger in the vagina, so as to admit of being read off when the instrument is withdrawn. The sound, as sold in the shops, is almost always bent at an obtuse angle at

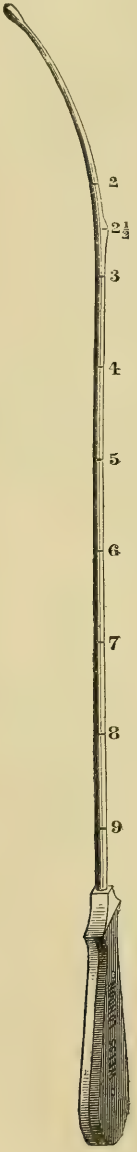

Fig. 43.—(Half size.)
SIMPSON'S UTERINE SOUND.

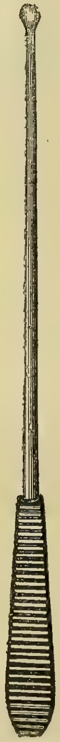

Fig. 44.—(One-third size.)
BARNES'S WHALEBONE SOUND.

the 2½-inch elbow, the two parts above and below being quite straight. It is more convenient in practice to give a slight curve to the part above the elbow.

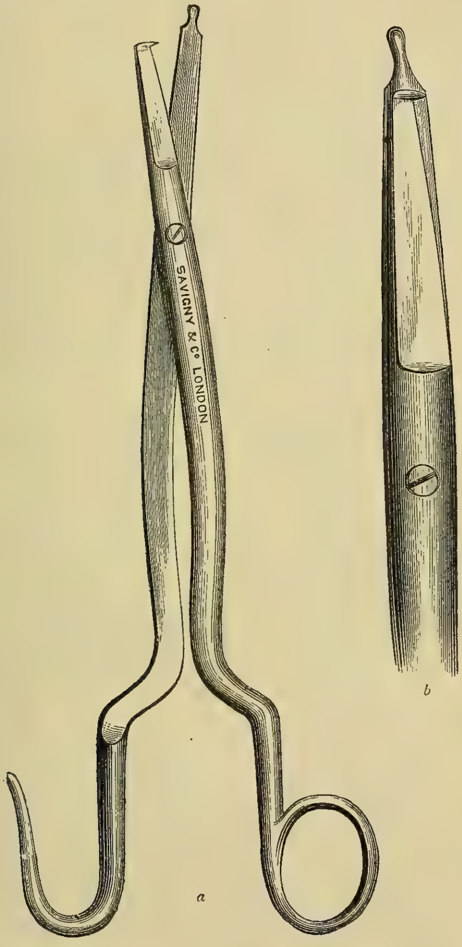

Fig. 45.

KÜCHENMEISTER'S METROTOME-SCISSORS.
a. Half size. *b.* Full size.

There are cases, notably those where the canal of the uterus is much deviated by tumours, where the use of the rigid sound is objectionable. In cases of this nature it is occasionally more useful to employ a flexible bougie or sound. An ordinary male bougie is very suitable. Dr. Henry Bennet commonly uses bougies of soft material, which retain the impression of any constriction they may have passed through. Dr. Thomas uses* a hard rubber sound, about 12 inches long, provided with a knob at the end similar to the figure (Fig. 44), taken from the instrument which I use. This is made of whalebone, which is sufficiently flexible and durable, and is not likely, as the vulcanite one is, to break. My instrument is 15 inches long, not at all too long to track the elongation of the uterine cavity produced by some cases of fibroid tumour.

The *speculum forceps* should be about 12 inches long, and *straight*. It is sometimes made with an angle between the joint and the finger-holes, under the mistaken idea that when straight the handles and hand occlude the field of the speculum, and interfere with accurate manipulation. This objection is not real. There is a practical inconvenience in the handling of a bent forceps. It will not, for example, rotate handily, so as to wipe off adhering secretions, as the straight forceps will. The instrument should be toothed at the ends, and grooved longitudinally, so as to hold a rounded stick of nitrate of silver, or potassa cum calce.

Metrotomes.—The instruments I employ to incise the cervix uteri are Simpson's metrotome, and either a scissors designed by myself or Küchenmeister's. The reasons for this preference will be given when discussing the operation. Simpson's metrotome is really a *bistouri caché*, with a long handle. When closed the blade and its guard or sheath form a rod about the size of a sound, which is easily passed into the cervix uteri. When there, by depressing the handle to an extent determined by a regulating screw, the blade is made to start from its guard, and cuts its way out. The guard is sometimes made double, so that the blade sinks back between the two parts. This is inconvenient. When the blade, after having cut, is allowed to fall back into its guard, the point is apt to pinch a bit of tissue in the guard, and the withdrawal of the instrument is thus made awkward. A single guard answers quite as well, and is free from this little difficulty (see Fig. 46).

Küchenmeister's Metrotome Scissors.—Ordinary scissors are not well adapted to make an incision clean through a rounded wedge-shaped body, which shall be of equal depth at every part. The blades are liable to slide away a little towards the finish of the stroke, leaving a spur of tissue uncut. To remedy this I have often completed the incision made by my scissors with Simpson's metrotome. But for some years I have discarded my own scissors for a modification of Küchenmeister's scissors, one blade of which is provided with a small recurved hook. This buries itself in the tissue as soon as the part is seized, and holds it secure whilst it is being cut through. The instrument answers well. (Fig. 45.)

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* "Diseases of Women." Philadelphia, 1872.

Sims's Tenaculum Hook.—This is a very useful little instrument for seizing and holding steady the cervix uteri for examination, and during other operations through the speculum. (Fig. 47.)

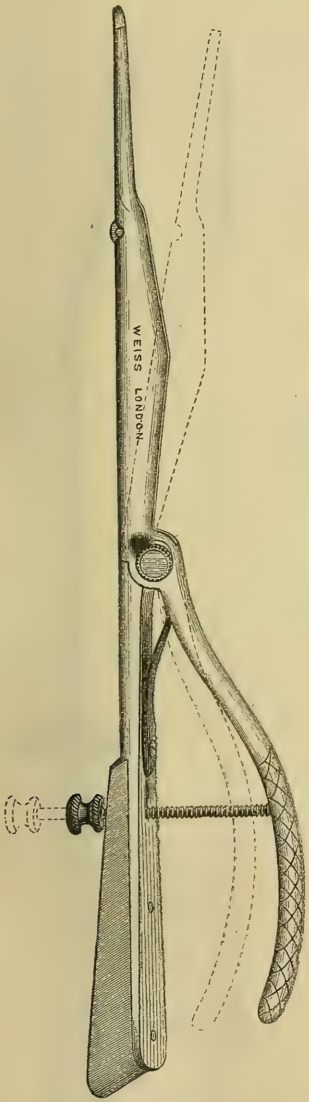

Fig. 46.
SIMPSON'S METROTOME.

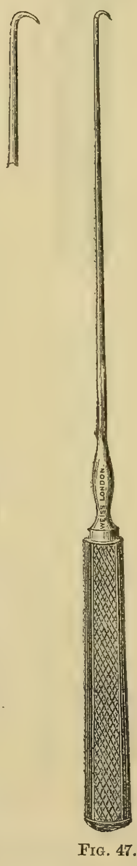

Fig. 47.
SIMS'S TENACULUM HOOK.

The *Wire-écraseur.*—Advancing experience has gradually

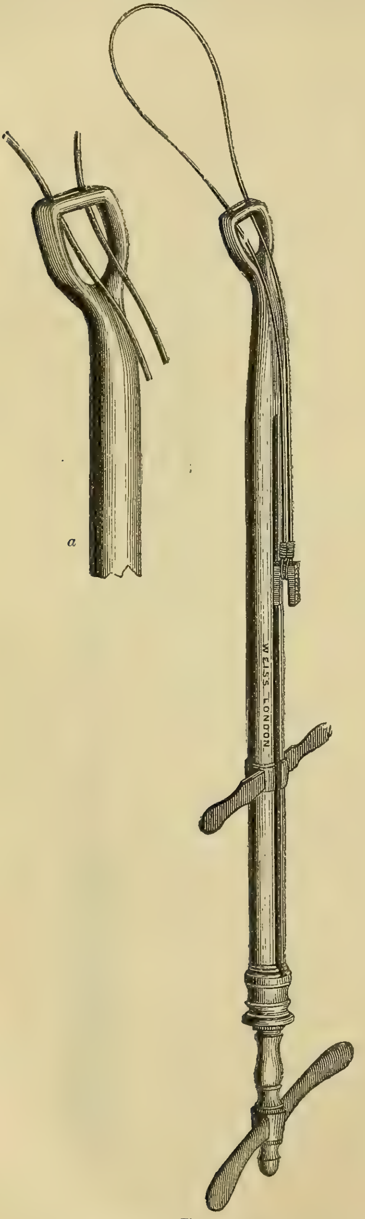

Fig. 48.
IMPROVED WIRE ÉCRASEUR.
a. Full size.

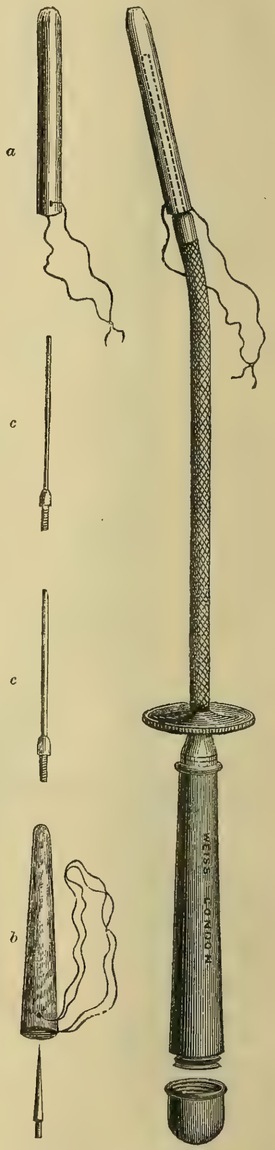

Fig. 49.—(Half-size.)
BARNES'S INSTRUMENT FOR INTRODUCING LAMINARIA OR SPONGE-TENTS INTO THE UTERUS (R. B.).
a. The hollow laminaria-tent.
b. The sponge-tent.
c c. The stilets upon which the tents are mounted.

proved the superior convenience of the form of écraseur here illustrated. (Fig. 48.) For ordinary purposes, such as the removal of polypi, the single wire is far more convenient than the chain. The two ends of the wire are hooked on to the hook which travels in the screwed stem of the instrument. The loop of wire, which has seized the body to be cut through, is drawn through the flattened eye at the end of the stem without any sawing movement. This involves a considerable loss of power; but in the majority of cases this is of no importance. An advantage possessed by this arrangement is that a much longer loop can be worked, since the loop comes down double; whereas, when one end of the loop is fixed, and one only travels, the travelling end may be brought home too soon, that is, before the loop has cut through the tissues embraced in it. There is, however, the advantage of a half-sawing or cutting action, which increases power. To obviate the inconvenience of the ends of the wire travelling home before the loop has done its work, Messrs. Weiss have constructed a very powerful écraseur, furnished with a windlass upon which the wire is wound as it is brought home. This gives practically an endless rope. It is a splendid instrument; and in some cases it will succeed where ordinary instruments will fail. To cut through large fibroid tumours a very powerful instrument is necessary.

The Laminaria and Sponge-tent Carrier.—This is a very useful instrument, contrived by me some years ago, to carry laminaria-tents into the uterus. It consists of a piece of elastic catheter having the end cut off, so that the stilet may project about two inches. Upon this portion of stilet the tent, which is hollow, is mounted. It thus makes one with the catheter, and can be passed into the uterus nearly as easily as the uterine sound. When the tent is *in sitû,* which is ascertained by the guiding finger at the os uteri, the stilet is withdrawn; the unsupported tent is then left in the uterine canal. This description shows that an efficient instrument can be improvised out of a catheter. But it is convenient to have a special instrument. (Fig. 49.) Mine is provided with two sizes of stilets, which screw into the stem; also with a pointed stilet to carry sponge-tents. These stilets are stowed in the handle, which is hollow. At the handle-end of the catheter or tube is a disc or shield which gives a point of resistance for the thumb, when the handle and stem are withdrawn.

The same instrument can be adapted to introduce the galvanic and other intra-uterine pessaries.

The Intra-uterine Caustic Carrier.—My contrivance for the application of nitrate of silver to the os and interior of the uterus is an adaptation of a plan which I learned, when a student, from Sir Benjamin Brodie. This illustrious surgeon used to arm the end of a silver probe by dipping it into fused

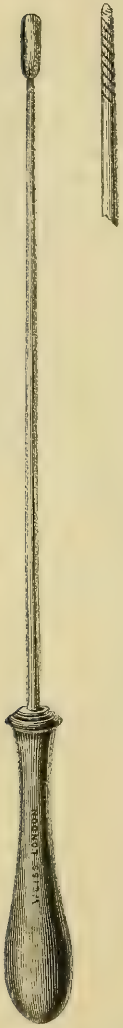

Fig. 50.—(Half-size.)
BARNES'S NITRATE OF SILVER CAUTERY (R. B.).
a, roughened end. *b*, armed.

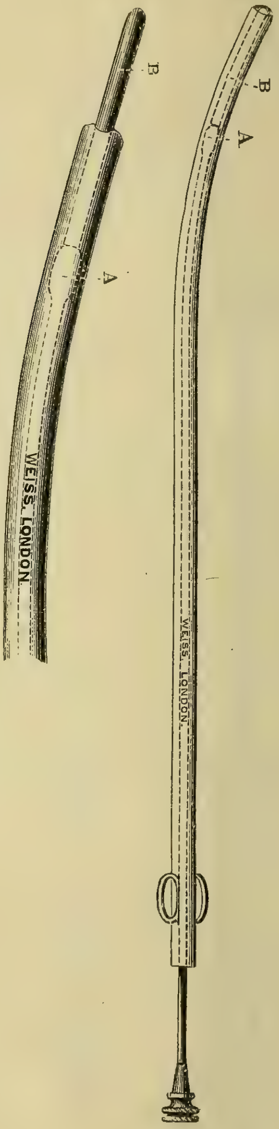

Fig. 51.
BARNES'S TUBE FOR DEPOSITING FUSED STICKS OF SULPHATE OF ZINC IN UTERUS (R. B.).
A, piston pushing out. B, the zinc stick.

nitrate of silver. I have had made a long probe mounted on a handle. The last three or four inches should be made of silver, platinum, or aluminium, so as to be flexible, as it is often convenient to give a curve. The extreme end should be roughened so as to hold the fused caustic better. To arm it, proceed as follows:—Fuse about half a drachm of nitrate of silver in a watch-glass or platinum-crucible, over a spirit-lamp or small gas-flame; dip into the fused caustic the end of the probe several times, so as to get several layers upon it. The probe should be moderately warmed in the flame before dipping, or the nitrate of silver will be apt to break off when cooled. (Fig. 50.)

By means of this armed probe, caustic can be carried into the cervical canal, and even into the cavity of the uterus, without any fear of leaving a piece behind. It may even be used without the speculum, although in doing this, unless it be guarded by a sheath, the caustic is liable to touch the vulva in passing, and to cause some irritation in consequence, and to blacken the surgeon's fingers. Armed with a sheath it resembles Lallemand's porte-caustique.

The Tube for carrying Solid Substances into the Uterus.—To apply sulphate of zinc, chlorate of potash, and some other substances, it is very convenient to fuse them into slender sticks of a given weight. To introduce these sticks into the uterus through a speculum by help of a forceps is a needlessly troublesome and sometimes difficult proceeding. A far more simple way is to cut off the end of an elastic male catheter, to place the stick in the end, and then to pass the catheter half an inch or more into the cervical canal, as you would a sound; then by pushing up the stilet, the stick is deposited in the uterus, and the instrument can be withdrawn. This can be done more easily without the speculum than with it; and where an application of this kind has to be repeated once or twice a week, this is a great advantage, saving the patient annoyance and fuss, and the surgeon trouble.

Instead of this improvised positor, it is better to have the special instrument figured. (Fig. 51.) This is a silver or nickel tube furnished with a stilet.

The Tube for carrying Ointments, &c., into the Uterine Cavity.—It is often convenient to make applications to the interior of the uterus in the form of ointment or fluid. For this purpose I have designed, with the assistance of Messrs. Weiss, a very handy instrument. It is a long silver, nickel, or vulcanite catheter, having two long eyelet-holes at the end, and a conical well-fitting piston or rod. It is easy to charge by plunging the end of the catheter beyond the eyelets into the ointment, and wiping off the superfluity which hangs to the outside. The instrument is then passed like a sound into the uterus, and then the piston, being pushed forward, expels the ointment by the eyelets on either side, leaving it, of course, in immediate contact with the uterine mucous membrane. This is an especially useful way of treating the uterine membrane affected by syphilis. The iodide of mercury ointment is thus readily

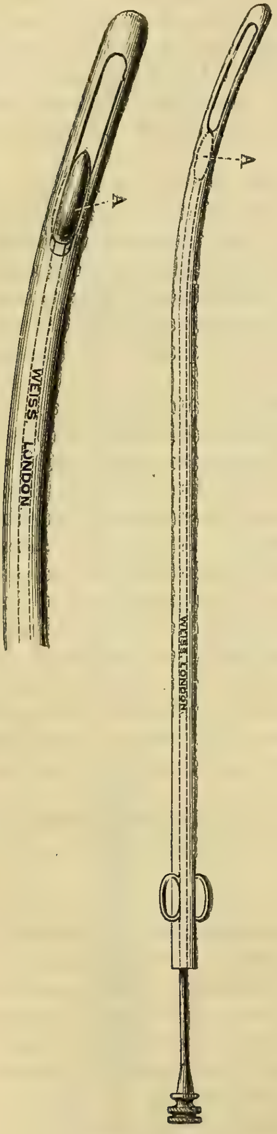

Fig. 52.

BARNES'S UTERINE OINTMENT POSITOR (R. B.).

The left-hand figure is full size. A, the sliding-piston, which, being pushed on after the catheter is *in situ*, expels the ointment, or fluid soaked in sponge.

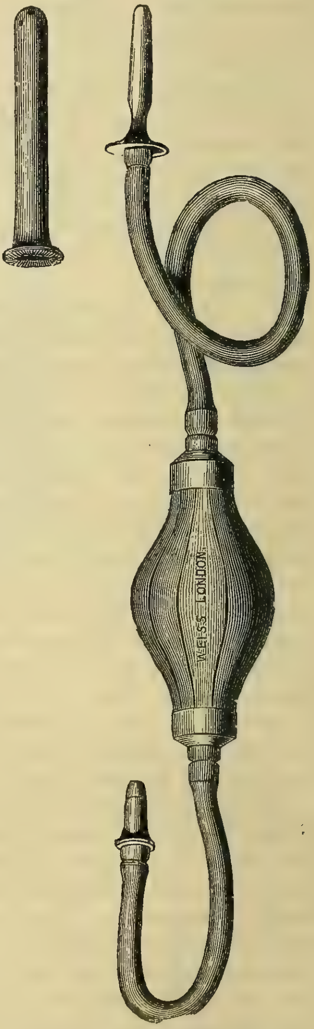

Fig. 53.—(Half-size.)

HIGGINSON'S VAGINAL SYRINGE.

applied. (Fig. 52.) It answers equally for the application of fluids. Thus by placing a bit of sponge in the end, and saturating it with the fluid, it can be passed into the cavity of the uterus. In this way I constantly apply tincture of iodine or nitric acid to the interior of the uterus.

An Intra-uterine Injecting Apparatus.—By means of the above contrivances for depositing solids, ointments, and liquids in the uterine cavity, the necessity for resorting to fluid injections is much restricted. But an intra-uterine syringe is sometimes indispensable. A good form is a small vulcanite tube, having minute perforations at the *sides*—not at the end—so that fluid projected may escape in fine streams or drops. The propelling force is best obtained by a moveable caoutchouc ball.

Higginson's Syringe for Vaginal Injection and Irrigation.—There is no form of vaginal syringe more generally convenient for the patient's own use than that known as Higginson's. (Fig. 53.) It should be furnished with a vaginal tube four inches long.

Barnes's Speculum for introduction of Cotton-wool charged with Remedies into the Vagina.—The best way of introducing pledgets of cotton wool charged with fluids or powders into the vagina is by help of the ordinary speculum. But this requires skilled assistance. To enable the patient herself to carry out this treatment, I have devised the speculum figured (Fig. 54.) It is made of vulcanite, a material not injuriously acted upon by the materials most frequently used. It consists of two blades, moving on a pivot about the middle, and a piston. The blades above the pivot are made to diverge by a spring inside; this divergence causes the blades below the pivot to come together, forming a hollow cylinder in which the pledget of wool is placed. The blades enclosing the pledget are further kept in contact by a strong elastic ring outside. When charged, the patient, by simply opening the vulva, can pass the instrument into the vagina, directing the point backwards as far as necessary; then by compressing the external diverging blades, the internal ones are opened, and by pushing on the piston or rod, the pledget is deposited in the vagina. The speculum is then withdrawn by leaving off the compression upon the external blades. The action of this instrument will be better understood by an illustration. It was suggested to me by the ingenuity of a lady whom I had advised to introduce pledgets of wool soaked in solution of bromine. She made use of a glove-stretcher to separate the labia vulvæ, and then slipped in the pledget with her fingers. My speculum is like a glove-stretcher, with the blades hollowed to protect the pledget whilst passing, and a piston to thrust it out into the vagina.

The pledget of wool is tied round with a bit of string. This string hangs outside the vulva, and by means of it the pledget is easily withdrawn. No pledget should be worn longer than five or six hours.

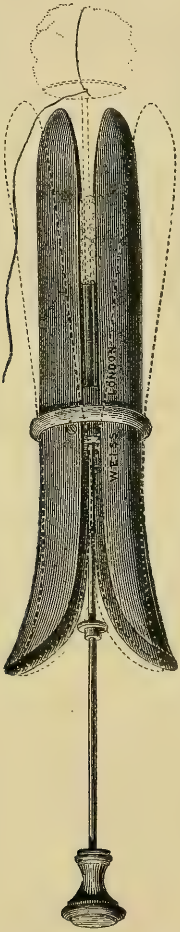

Fig. 54.—(Half-size.)

BARNES'S SPECULUM TO FACILITATE APPLICATION OF MEDICATED COTTON WOOL IN THE VAGINA (R. B.).

CHAPTER V.

THE DIAGNOSIS OF DISEASES OF THE PELVIC ORGANS. THE TOUCH—THE SOUND—THE SPECULUM.

THE general knowledge we have now acquired of the value of subjective symptoms and of the instruments of diagnosis, will enable us to pursue with greater advantage those means which bring out the objective signs, and thus to gain all the possible elements of a complete diagnostic conclusion.

One guiding rule should be impressed upon the mind of the young practitioner, when he has a case of presumed disease of the pelvic organs under investigation. Do not concentrate all attention upon this one region of the body. Remember that the fault may be in distant parts; that disease in other organs may complicate disease in the pelvic organs. Do not, in short, fall into the deplorable snare of becoming a specialist. Do not imitate the error of those physicians who, whilst repudiating the idea of being specialists, and who, when in the presence of a case marked by disorder of the nervous system, of the heart, lungs, or abdominal viscera, carefully explore the state of the organs contained in the skull, chest, and abdomen, yet scrupulously avoid exploring the not less important organs contained in the pelvis; and that even although the symptoms point to disorder in this region.

The great clinical rule should be: Interrogate all the functions; examine every organ. In this way only can we acquire a well-founded confidence that important disease is not overlooked; in this way only can we rightly estimate the relations of symptoms to disease, and the reactions of disease upon distant organs, and frame a rational plan of treatment.

A work whose intention it is to illustrate the pathology of the pelvic organs, must necessarily observe the limits of its design. The art of diagnosis, therefore, as applied to the pelvic organs, demands the most elaborate description. But in tracing this with almost exclusive care, as it must be done in a work *ad* *hoc,* it must not be supposed that general pathology or general diagnosis can ever be pretermitted in actual practice.

If it be admitted to be necessary to investigate all the functions of the body in connection with any presumed localized disease, *à fortiori* it is necessary, in any case of presumed disease of one of the pelvic viscera, to examine the state of the rest, its immediate neighbours. We must then never neglect to inquire into the state of the bladder and rectum. These organs seldom escape disturbance when the uterus, vagina, or ovaries are affected; primary disease in them, in its turn, affects the uterus, vagina, and ovaries; and not seldom, symptoms seemingly indicative of disease in the uterus or vagina are really due to disease in the bladder or rectum.

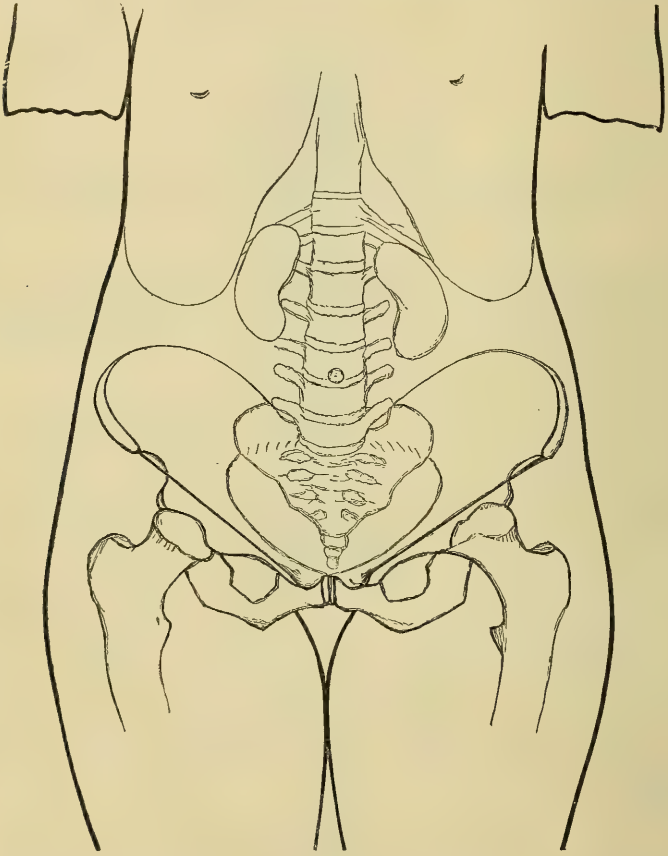

Fig. 55.

SKELETON DIAGRAM FOR RECORDING ALTERATIONS OF SIZE, POSITION, AND RELATIONS OF PELVIC AND ABDOMINAL ORGANS.

The order of clinical proceeding, then, may be laid down as follows:—

If a patient complain of distress referred to the pelvic organs, or disorder of their functions, note *first* the subjective symptoms; 2, interrogate the functions of the nervous, circulating, respiratory, and nutritive organs; 3, elicit the history of the

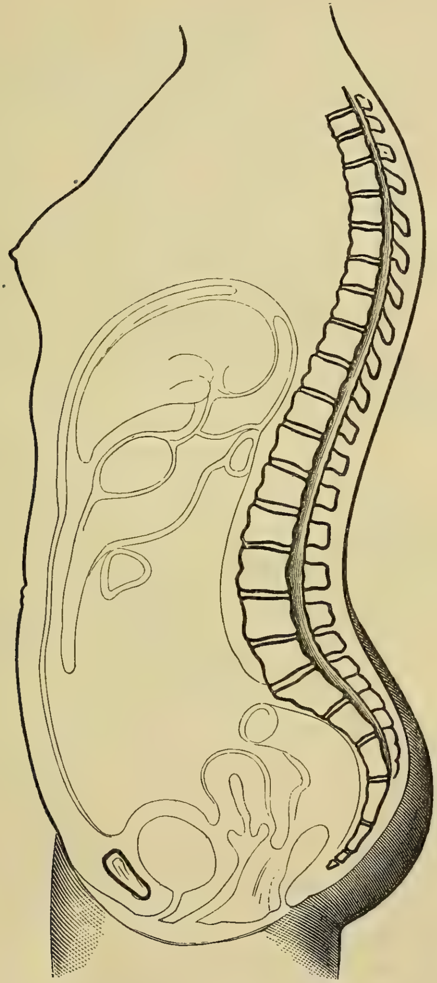

FIG. 56.

SKELETON DIAGRAM FOR RECORDING ALTERATIONS OF SIZE, POSITION, AND RELATIONS OF ABDOMINAL AND PELVIC ORGANS.

patient as to her general health, and the antecedents and course of her disorders; 4, if the indications point to disease in the chest or abdomen, subject the organs contained in these cavities to physical exploration by sight, palpation, percussion, measurement, auscultation, &c.; 5, subject to physical examination, by the methods hereafter described, the state of the pelvic organs, observing at the time, or reserving for chemical and microscopical analysis, the nature of the local secretions, or of solid substances expelled; 6, when all necessary information has been obtained, compare the symptoms and facts in their individual, relative, and aggregate significance, so as to work out the diagnosis which shall determine treatment.

In taking down a case, it is well to follow the order indicated above; and since "word-painting" can hardly be so graphic as actual drawing, it will be found of great service to attach to the notes diagrammatic memoranda of the position, shape, size, and other conditions of the organs under observation. These become extremely valuable as standards of comparison during the future progress of the case, and by furnishing more intelligible records for other persons. To record these observations, outline or skeleton diagrams like those represented in Figs. 55, 56, will be extremely convenient. The idea of these will be found in the grandest memoir on the diagnosis of abdominal tumours ever published, that of Dr. Bright, in Guy's Hospital Reports.

The physical exploration of the pelvic organs is conducted chiefly by the *touch*. The touch is applied either *directly by the hand*, or *mediately through instruments*. The touch is sometimes aided by *sight*, facilitated or not by the *speculum* or other contrivances for bringing concealed parts into view. The touch is also sometimes aided by the sense of *smell*.

The touch takes precedence in importance and in order of application of all other methods. We may therefore usefully recall what Gooch said about the "*tactus eruditus*." "Some are of opinion that this art is a blind tact, to be gained only by practice; but this is not true; the period of my life when I improved most rapidly in the art of deciding by examination cases of doubtful pregnancy was that in which I gained clear and orderly notions of the objects of examination. The faculty of observation requires rather to be guided than to be sharpened; the finger soon gains the faculty of feeling, when the mind has acquired the knowledge of what to feel for."

The "tactus eruditus" may be defined as the "educated touch." How is the finger educated? Greatly by practice in *feeling* the various conditions of form, size, consistency, and relations of the parts upon which this sense is to be exercised. But touch alone will never give perfection to the finger as an instrument of diagnosis. We must be content, if we would attain precision in its use, to imitate the example of children who, in their earliest introduction to the study of external objects, correct the evidence of one sense by appealing to another. When they see a strange object they try to feel it also, and even to taste it. It is by this tentative method of cross-testing that children extend their knowledge of Nature. We must do the same. We must correct touch by sight, and even call the other senses to our aid.

Manual examination, or examination by touch, embraces the following modes of exploration:—In some, one or both hands only are used; in some, the hand is aided by the sound or other instrument.

1. *Simple vaginal touch*, by one finger.
2. *Abdomino-vaginal.*—The vaginal touch is aided by abdominal palpation with the other hand.
3. *Simple rectal touch.*
4. *Recto-abdominal.*—The finger in the rectum is aided by abdominal palpation. This mode is often useful in determining the size and relations of the uterus, the complication with uterine or extra-uterine tumours, or the existence of the uterus in vaginal atresia.
5. *Recto-vaginal.*
6. *Urethro-vaginal.*—The finger in the vagina is aided by the sound in the urethra.
7. *Urethro-rectal.*—The finger in the rectum is aided by the sound in the urethra; indispensable in investigating cases of vaginal atresia.
8. *Simple abdominal palpation and percussion.*
9. *Uterine exploration by the sound.*
10. *Utero-abdominal.*—The sound *in utero* is aided by abdominal palpation.
11. *Utero-rectal.*—The sound in the uterus is aided by rectal touch.
12. *Examination by speculum.*—Here the sight is the main source of information.
13. *Examination of the secretions, discharges, or substances expelled.*

Before instituting intra-pelvic exploration it is desirable to ascertain the state of the abdomen. The patient in dorsal decubitus is examined by palpation and percussion to determine the presence or absence of abdominal tumours or of pelvic tumours rising into the abdomen. This subject will be found carefully discussed under the diagnosis of ovarian tumours.

THE MODE OF MAKING A DIGITAL EXAMINATION.

Examination by the hand should always precede the use of instruments. Because,—1st. In many cases the information gained by the hands is sufficient; 2nd. The information gained by the hand commonly tells us how best to use other diagnostic instruments; 3rd. In some cases, notably in cancer, in which sufficient information can be gained by the hands, instruments may do positive harm.

The patient is placed either in the lateral or dorsal decubitus. Each position has its advantages. In making a first exploration for diagnosis, it is most convenient to place her first on her left side, the knees drawn up, the head and shoulders directed obliquely across the couch, on a level, or nearly so, with the nates, and the nates brought near the edge of the couch. This affords perfect facility for digital touch, also for the sound, and often for the speculum. If the patient lies on her left side, the surgeon will find it best to use his left hand, for then his right hand is conveniently disposed for palpation above the pubes, and to examine in concert with the finger of the left hand in the vagina. If he can only touch with his right finger, he must cross his left hand awkwardly over his right to get at the abdomen. It would be better in this case to place the patient on her right side, when things will be disposed conveniently for the right-handed surgeon. But the obstetric surgeon, like his ophthalmic brother, ought to be ambidexter, and should sedulously cultivate the equal use of both hands.

Supposing the patient to lie on her left side, the usual obstetric position, the surgeon having anointed his left index with cold cream, olive oil, glycerine, vaseline, or soap, arranges the bed-clothes or dress with his right hand. To lessen risk of infection, it is well to use carbolized oil. The radial edge of the left hand is then directed between the nates, and determines the relation of the parts by feeling the lower end of the sacrum and coccyx and anus; the finger then passing along the raphe of the perineum, comes necessarily to the edge of this structure at the posterior commissure of the labia, and therefore falls surely between the labia; the pulp of the finger is made to enter at this spot, and its further progress is made by pressing the back of the finger against the distensible perineum and onwards, following the curve of the sacrum. The reasons for this mode of proceeding are to save the patient the annoyance of touching the sensitive structures at the pubes, and to get at once between the labia, which it is not always easy to do, if the finger be directed more forwards. It is also much more easy in this way to follow the curve of the vagina. To reach the os uteri, which often lies high up under the promontory of the sacrum, it is commonly necessary to press the perineum well back. The os uteri is found, then, by making the finger feel its way all along the posterior wall of the vagina to its roof, until the cervix is reached. It first takes note of the size, shape, firmness, and character of surface as to smoothness or roughness of the vaginal-portion of the cervix; of the character of the os externum as to patency or closure, of its form, whether a fissure or round. Having made these observations, the finger next takes note of the condition of the supra-vaginal-portion of the neck and of the body of the uterus.

Feeling all round the vaginal-portion, pressing the finger lightly into the fundus of the vagina, in some portion of the circumference, the resistance due to the solid cervix or body will be felt. Following this, the cervix is traced by continuity into the body. If the uterus is in normal position, its body is felt in front of the cervix through the upper and anterior wall of the vagina. Three other points may now be studied: the bulk, the sensitiveness, and mobility of the uterus. The bulk is estimated by poising the cervix uteri on the tip of the finger, whilst the hand is pressed in above the symphysis pubis, until the solid body of the fundus uteri is felt. Thus, the uterus is caught in its extreme length between the two hands, and allowance being made for the thickness of the abdominal wall, a fair idea is obtained of its length and bulk. The necessary pressure will determine the sensitiveness of the uterus; and the poising of it on the finger, alternating with depression on the fundus, brings out the degree of mobility.

If the uterus is in reclination, the solid resistance of cervix and body is felt through the vaginal roof behind the os. Again, by combined abdominal palpation, the body is caught between the two hands, not in its long axis, for the fundus lies under the sacral promontory, but across its body. The diagnosis is verified by bringing the examining finger in front of the cervix; and then when abdominal palpation is resorted to, the hands approaching each other, find no intervening body, *i.e.*, no uterus between them.

The finger next explores, by aid of abdominal palpation, the lateral regions of the pelvis. In this way, if there is deposit in the broad ligament, distension of the Fallopian tubes, or enlarged or prolapsed ovary, the abnormal condition may be made out.

THE DIGITAL RECTAL TOUCH.

The lateral position of the patient is still the best for the examination by the rectum. The forefinger, lubricated, is passed into the rectum, and exploring as it goes the anterior wall, the uterus is felt through it. Commonly, the vaginal-portion is easily made out. If the uterus is strongly anteverted, so that the os is thrown backwards, this part will project into the rectum. This position will account for the pain sometimes suffered at stool, when the cervix uteri is inflamed and enlarged. One of the greatest advantages, however, gained by rectal touch, is the greater reach it gives one over the body of the uterus; and the greater area brought under exploration. The finger not only reaches much higher, but may be made to sweep right and left in the lax rectal pouch, getting well behind the broad ligaments, feeling the ovaries, and examining the state of Douglas's pouch. If the uterus be retroverted or retroflected, the finger may usually reach the very fundus, and thus take a very accurate estimate of its bulk, form, position, and sensitiveness. The ovaries, again, which lie a little behind the uterus, may, in some of their abnormal conditions, often be explored with precision by the rectum. In the case of some uterine tumours and retro-uterine effusions, as hæmatocele, or peri-uterine effusions, examination by rectum supplements vaginal touch, giving often even more valuable results. Combined with abdominal palpation, rectal touch determines with great accuracy the bulk of the uterus. It can often be commanded more completely in this way than by vaginal touch. In some cases it is justifiable, under anæsthesia, to pass the whole hand into the rectum.

EXAMINATION BY THE BLADDER.

It is possible and sometimes desirable to explore the bladder by the finger in the urethra. This canal in the female is short and very distensible. It may be dilated very quickly by Weiss's urethral dilator. But in the majority of instances, mediate exploration by the catheter or uterine sound supplies the information that is sought.

The exploration of the abdomen by palpation and percussion is, of course, best conducted with the patient in the dorsal decubitus; and this position is also often the best for the combined vaginal touch and abdominal palpation. The uterus in this decubitus is more easily grasped and pressed down into the pelvic cavity into contact with the finger in the vagina.

Further information is gained by the *sound*. This is virtually a lengthened finger. It extends the sense of touch beyond the point which the finger can reach. If there be sufficient indication to use it, it should be introduced before the finger which has been making the observations already described is withdrawn, as it is desirable to avoid the necessity of having to repeat the vaginal touch.

Before taking up the sound, one precaution is imperative. Be satisfied that the patient is not pregnant. We may acquire reasonable assurance of this negative if, by combined vaginal touch and abdominal palpation, we find the uterus not exceeding the normal bulk, and the os uteri hard and small. If, on the other hand, we feel the os uteri soft, tilted far back under the promontory of the sacrum; if we feel "anterior vaginal roof-stretching," and the bulk of the uterus increased, the presumption of pregnancy is great. Then, do not take up the sound. Another rule is useful. Never use the sound unless you have trustworthy evidence that the patient has fairly menstruated within the preceding fortnight; or that the suspension is not due to pregnancy.

As this rule in practice is exceedingly important, I introduce a special illustration in order to draw attention to the physical signs which afford presumption of early pregnancy. (Fig. 57.) The suspicion of pregnancy, however, does not necessarily exclude the speculum. And this instrument may be the means of clearing up the doubt. The deep violet colour of the vaginal-portion and vagina, and the thick creamy discharge, added to the increased bulk and anterior vaginal-roof stretching, constitute a strong body of evidence rendering the diagnosis of pregnancy almost certain. It is also generally improper to use the sound if there is evidence of metritis, or extreme tenderness on touching.

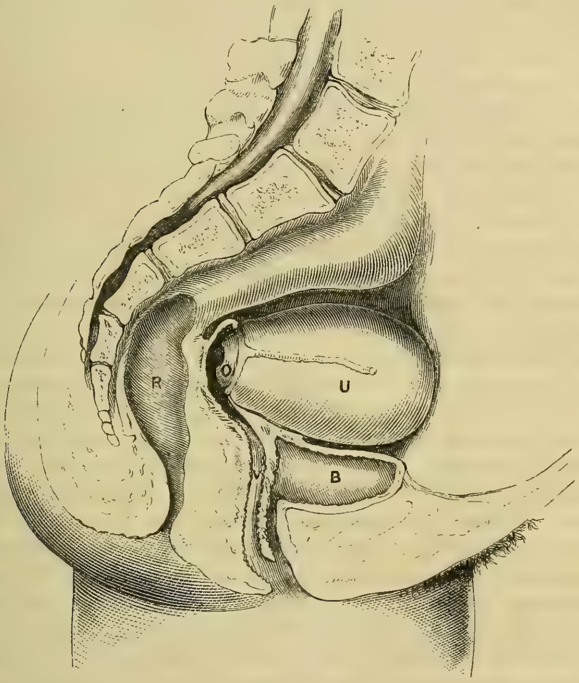

Fig. 57.

DESIGNED TO ILLUSTRATE DIAGNOSIS OF EARLY PREGNANCY (R. B.).

B, bladder. R, rectum. U, gravid uterus in anteversion. O, os uteri tilted up, and stretching the anterior vaginal wall from O to V, making this part tense and elastic.

THE MODE OF USING THE UTERINE SOUND.

The patient still lies on her left side. The examining finger on the os uteri serves as a guide. The sound, held with its concavity forward, is carried along close to the examining finger to the os, into which it is introduced. When it has passed an inch or so, an obstruction is commonly met; this is the isthmus, or os uteri internum. At this point the direction of the cervico-uterine canal changes; and a corresponding change must be given to the direction of the point of the sound. When the axis of the uterus is normal, the canal curves gently forwards, so that by carrying the handle of the sound lightly backwards the point will follow this curve. In giving the direction to the sound we are guided by the information gained by the digital touch. The body of the uterus has been felt in front of the cervix. As the point of the sound passes on, the finger on the os uteri takes note of the extent to which it passes, and when it feels the elbow or projection which marks off two and a half inches from the point, on a level with the os externum, a sense of resistance is communicated to the touch. The point has reached the fundus of the uterus, usually the most sensitive part, and the patient will commonly complain of pain unless the utmost gentleness is used. The introduction of the uterine sound resembles the introduction of the vesical sound or catheter in the male urethra. It requires the like delicacy of touch; the instrument is made to feel its way rather than to be propelled by force. When the sound has touched the fundus, by imparting light movement to the handle backwards and forwards, we ascertain more clearly the mobility of the organ, its relation to neighbouring parts, and especially if the form or bulk of the uterus is altered by fibroid or other tumour in its walls or outside. Whilst the sound is *in sitû* supporting the uterus, the hand outside depressed above the pubes readily feels the fundus, and this pressure is communicated through the sound to the hand which holds it. By this combined manipulation also a closer idea is formed of the size, form, mobility, and relations of the organ.

The variations in the mode of using the sound required by different morbid conditions will be described in the appropriate places. It will be sufficient to add in this place a brief description of the mode of using it in retroversion or retroflexion of the uterus. If there be retroflexion, the finger feels behind the vaginal-portion the angle of flexion and then the body of the uterus. To get the sound into the down-bent body, its curve must be increased, and when the point has reached the os internum, the curve must be reversed, that is, the concavity must be turned backwards to follow the curve of the uterus. The manœuvre by which this is accomplished resembles the *tour de maître,* by which the male sound is made to enter the bladder after reaching the pubic arch. The point remains nearly stationary, merely turning on its axis, as the handle is made to describe a large radius. Unless this be neatly done, the point is apt to slip out of the cervix, and by describing a large radius to cause pain. The principle of this manœuvre is made manifest by the following experiment. Lay the sound on a sheet of paper, and trace its outline on the paper (Fig. 58). Then keeping the point fixed by a finger, give a semi-rotation to the handle so as to reverse the concavity of the curved end. It will be seen that the uterine end simply turns upon its axis without changing its position. The sweep of the handle is done with the minimum of force; it is almost made to turn by its own weight. When reversed, the point of the sound is made to pass the isthmus by a double consentaneous manœuvre; the guiding finger runs up the posterior wall of the cervix, and lifts up the body of the uterus, straightening it a little so as to bring the extreme curve of the uterus more into agreement with that of the sound; at the same time the handle of the sound is carried forward under the arch of the pubes, so as to make the point take the direction of the uterine canal. When the sound has passed as far as its elbow, it will commonly have

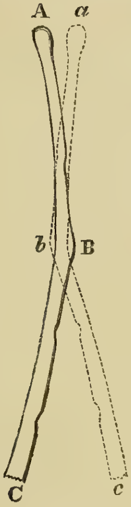

FIG. 58.

SHOWING THE REVERSAL OF THE SOUND IN UTERO.

B corresponds to the os externum uteri. The handle extended from C describes a large radius in reversal. B is a fixed point during the semi-rotation of the instrument, and the end A performs a very small curve in the uterine cavity. If A B be straight, it will simply rotate, and A *a* will coincide. (R. B.)

reached the fundus. The next object is to ascertain the mobility of the fundus, and to restore it to its natural place. To do this the concavity of the sound must be again reversed; and again the same manœuvre must be practised as before passing the os internum. The handle is made to describe a still larger radius from before backwards, so as to make the point and the intra-uterine end rotate upon their axis. The effect of this will be to lift up the fundus a little. To bring it forward to its proper position of moderate anteversion, the handle is carried backwards, with a circular sweep upwards, at the same time that the finger on the fundus uteri depresses this part in the opposite course, thus clearing the projecting promontory by passing by its left side, into the iliac region. Having done this, the handle is carried more directly back, and the point going forward, takes the fundus uteri into its normal anteversion. This manœuvre is *bi-polar reposition.* The sound in utero makes one body or lever with it; and we act upon both poles. We can now feel the fundus supported on the sound by abdominal palpation above the pubes. Sometimes, after clearing the os externum, the knob is arrested before it has reached the os internum. The reason of this will be understood by looking at the structure of the cervical canal. The knob is liable to get caught in one of the crypts or furrows formed between the ridges of the arbor vitæ. This hitching is likely to happen when the knob is too small; a larger one will ride over the pits. But even with a well-chosen sound the accident may happen if the patient has long suffered from chronic cervical leucorrhœa. Then the mucous membrane is hyperæmic, swollen, flabby, and the folds of the arbor vitæ rise and overlap, so that the point of the sound is easily caught, as it were, in a pocket.

Some remarkable *accidents* prove the necessity of exerting the utmost care and delicacy of touch in using the sound. The point of the instrument has actually perforated the fundus of the uterus. Two cases were observed by Schroeder. In both the sound went without force six inches deep, and its knob was felt through the thin abdominal walls. Both were puerperal women. No bleeding, pain, or other bad symptom followed. Professor E. Martin relates a case * in which the perforation was verified by autopsy. Mr. Lawson Tait relates † that Sir James Simpson was well aware of this accident, and regarded it as of no consequence. Matthews Duncan suggests that the sound may have run along an unduly patent Fallopian tube. Hoening denies that it is possible. It requires more distinct proof than Dr. Duncan has given. Even feeling the point of the sound with great distinctness through the abdominal wall is not positive proof that it has passed through the uterus. The intervening uterine wall and other structures may be so thin as easily to lead into error. In some of the cases in which the sound thus perforated the uterus, notably in the two puerperal cases of Schroeder, it is probable that the uterine tissue was abnormally soft. However this may be, it must be borne in mind that the sound roughly used may wound the uterus, and even perforate it. I am unable to look upon the accident as of little importance. The most careful and judicious use of the sound is sometimes attended and followed by intense pain. Metritis has occurred; and this even when there was no reason to infer that the wall had been perforated. That fatal accidents have occurred from the use of the sound can hardly be doubtful. I repeat, then, the injunction to avoid anything like force in introducing the sound. It is a question of skill, not of strength. If there be any obstacle to the progress of the instrument, it must be either evaded or turned, or the attempt to pass it should be given up.

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* "Neigungen und Beugungen der Gebärnnutter."

† "Lancet," 1871.

Some physicians are in so great dread of accidents from the uterine sound, that they condemn it altogether. This is unreasonable. The surgeon does not abandon the male sound or catheter because inexpert people make false passages.

Occasionally the sound is used through the speculum; but as a rule this is a mistake. When this is done, we sacrifice the aid which the finger gives in guiding the sound, and facilitating its passage into the body of the uterus by tilting up the body so as to lessen any abnormal curve or angulation. And when the uterus is much bent, it is impossible to make the sound follow the flexion without imparting a corresponding, perhaps painful, inclination to the speculum. Moreover, when the sound is passed through the speculum, we lose much of the information which the sense of touch imparts.

One use, however, the sound possesses in conjunction with the speculum. It serves to depress out of the field of vision projecting folds of vagina, to bring the os uteri more fairly into the axis of the speculum, and by passing the point a little way into the os, and pressing upon one or other lip, we may expose a considerable surface of the cervical canal.

MODE OF USING THE SPECULUM.

Before using the speculum, we have to consider the *means of illumination.* Daylight is preferable, and the line of light should be horizontal or at a slight angle above the horizon; the foot of the couch or bed, therefore, should be opposite a window. If a Fergusson's silvered speculum be used, even a dull light will commonly be sufficiently reflected and focussed to give a good view at the field. But even well-polished metal valvular specula are not so well calculated for success when the light is bad. When the valves are expanded they diverge, and reflection and focussing are almost lost. My "crescent-speculum" is, however, excellent for light. When we have to depend upon artificial light, a short bit of wax-candle is all-sufficient. But I have had made a small candle-lamp with a reflector which serves to focus the light into the speculum, and at the same time to screen the eyes of the observer.

The Tubular Speculum.—As a general rule the dorsal position is the best; but it is a necessary condition that the bed or couch upon which the patient reclines be firm in the centre, so as to obviate sinking of the nates in a hollow. To maintain the nates at a proper elevation for the admission of a good stream of light, striking horizontally from an opposite window, or at most at an angle of 45° from the horizon, it is also essential to keep the shoulders and head of the patient only slightly raised above the level of the nates. A proper position of the patient saves her from unnecessary annoyance, and makes all the difference between success and failure to the surgeon in carrying out the examination.

The surgeon, standing or kneeling at the side holding the speculum lubricated and warmed in one hand, explores with the index of the other hand to determine the exact position of the cervix uteri, the object being to get this part in the centre of the field of the speculum. Having settled this point, he draws the finger back to the vulva, and brings up another finger to hold open the labia; the speculum, guided by these fingers, is then passed into the vulva by getting the end well over the perineal border first; then, before pushing the instrument onwards, its end is pressed backwards so as to depress the perineum. This manœuvre carries the instrument away from the pubic arch, where it might cause pain by jamming the soft parts against the bones, and directs it towards the hollow of the sacrum in the direction of the axis of the pelvis. The further direction of the instrument is governed by the idea which was gained of the position of the os uteri by the exploring finger. When fully introduced, if the os should not be found in the field, the instrument must be withdrawn a little way, and the end shifted so as to bring the cervix within the field.

Sometimes it is difficult to catch the os uteri in the field of the speculum. This may be due to the bladder being empty, when the body of the uterus will come forward, whilst the os will be raised backwards. When thus directed, the uterine neck may be almost impossible to seize if the speculum cause any pain, for then the muscles of the abdomen contracting, lower the body of the uterus still more, exaggerate the inclination of its axis, and fix it in its exceptional position.

The os in view, note is taken of the aspect of the part, and of the character of the discharge. The surface is often bathed with secretion so that it cannot be well seen, and the secretion, moreover, would interfere with the application of remedies. This is removed by a small pledget of cotton wool carried by the speculum-forceps.

When visiting a patient at her own home it is often most convenient to examine in the lateral position. The bed or the source of the light may render a satisfactory examination in the dorsal decubitus impossible. The patient then is placed on her left side on the right side of the bed, the nates being drawn well up to the edge, the knees slightly drawn up, and the head and shoulders bent forward towards the middle of the bed and laid low, so as to keep the nates high. Unless all this be done, great difficulty will be experienced in getting a direct line of light, as well as in introducing the speculum. The patient in position, exploration is made with the left index, and the speculum is inserted with the same precaution as in the dorsal position. An advantage attending the lateral position is, that artificial light is more easily made to serve where sufficient daylight cannot be had.

The Introduction of Sims's Speculum.—The facility of introduction of Sims's speculum is one of its recommendations (Fig. 41). The patient lying in the semi-prone position on her left side, the right leg is made to cross in front of the left; this brings the vulva well within manipulation, and makes it the highest point of the vaginal canal. The effect of this is, that by placing the uterus at a lower level, the intestines fall away from the roof of the pelvis, and the uterus tends to gravitate with them. Then when the speculum is *in sitû*, the cervix uteri is drawn forward out of the hollow of the sacrum in front of the speculum, and the line of light being at a slight angle above the horizon, flows well down to the cervix at the bottom. This direction is also the most convenient for therapeutical manipulation.

The mode of passing the instrument is easy. The exploring finger determines the position of the cervix uteri, and the capacity of the vagina and vulva. The larger or smaller blade is selected accordingly, and then holding open the vulva with one or two fingers, the end of the blade is slipped in as near the perineum as possible, first with the width of the spoon in a line with the vulvar fissure, and then, as soon as the end has fairly entered, the instrument is rotated so as to bring the back of the spoon against the perineum; the guiding finger in the vagina then, aided by gentle pressure on the handle by the other hand, carries the point of the blade along the posterior wall of the vagina to its place behind the cervix. When *in sitû*, in order to bring the cervix into view it is necessary to hold back the instrument firmly against the perineum, which being distensible and yielding permits the curved vagina to become straight, and thus the cervix to be seen. Sometimes when the vagina is large and lax, the anterior wall will bulge up against the speculum, and however much the perineum may be retracted, the cervix cannot be seen, until either by the finger, the handle of the sound, or a retractor made like a tongue-depressor, the anterior wall of the vagina is pressed up against the pubes. Sims further recommends the use of a fine hook (see Fig. 47) to seize the vaginal-portion, to pull it up into sight, and to fix during the application of remedies to the surface or to the interior of the uterine cavities. This hook causes little pain, and the flow of a few drops of blood. But although very convenient in some cases, it may be dispensed with as an habitual aid in examination and treatment.

Introduction of the Author's "Crescent-Speculum."—The passage of the first blade is made exactly in the same way as Sims's speculum. The patient lying in the semi-prone position on her left side, the surgeon takes the larger blade (Fig. 42) in his left hand, whilst one finger of the right hand introduced through the vulva feels for the os uteri; this finger serving for a guide, the end of the blade is slipped in over the perineum in close approximation to the finger, and carried along it so as to get behind the os uteri. If this direction is followed, there will be no hitch against a fold of the vagina. When the blade has passed in, the handle is held well back so as to depress the perineum. The right knee is then raised so as to enable the surgeon to introduce the second blade, which being a degree smaller than the first, fits into it as in a groove. The uterine end is adapted inside the blade of No. 1, held firmly with the left hand, and is then made to slide down in No. 1 until the handles of the two blades are on the same level. Then the two handles being brought forward, the two blades work as bent levers, upon the angle of junction of handle and blade, which serves as a hinge or fulcrum; the uterine ends thus diverge like two valves, stretching the roof of the vagina, and giving an excellent view of the vaginal-portion.

The withdrawal of the instrument is very simple. The two blades are removed separately, the anterior one first. The gentlest traction in a curved sweep following the curve of the blade will bring the instrument out, the contraction of the vagina helping to expel it.

CHAPTER VI.

THE PATHOLOGY OF THE OVARIES.—THE HISTORY OF MENSTRUATION AND ITS DISORDERS.

The relation of the ovary to the function of menstruation has been referred to when describing the anatomy of this organ. A few further observations upon this subject are necessary to serve as an introduction to the study of the disorders of menstruation, and of the organic diseases of the ovary.

The most important laws in this application to pathology are illustrated in the following facts:—

The *catamenia,* the name given by Aristotle to the monthly discharge from the uterus, indicates the periodicity of menstruation. In all languages, and throughout all ages, names indicating this periodicity have been adopted. The "menses," "menstruation," "les mois," "les règles," are examples.

But this character of periodicity, so striking, was not traced to its true cause or connection until the present century. It was scarcely suspected, certainly not demonstrated, that the periodical monthly flow was dependent upon another periodical act, the ripening of ova. Dr. Power, a man of singular sagacity, seems to have been the first to seize upon this great fundamental fact. In 1821 he distinctly enunciated the theory. Girdwood, in 1826, brought new observations in proof. It was, however, warmly disputed in this country, especially by Dr. Robert Lee, whose authority probably retarded its general acceptance, so that it was not until Négrier,* in 1831, working as it appears independently, proved by adequate researches and anatomical preparations, that the outward and visible periodical discharge of menstruation was the expression, the consequence of an internal and hidden, but superior function. Gendrin, Paterson, Raciborski, Bischoff, and others followed with fresh proofs which are generally held to have established the theory. The preparations of Coste, preserved in the College of France, show the following points :—A Graafian vesicle, the ripening of which always coincides with the turgescence of the genital organs, pursues the course of its development during the various phases of menstruation; and, according as the circumstances are more or less favourable, it may burst at the commencement, or towards the end, or at any moment of this periodical discharge. In a woman who died on the first day of the appearance of the menses, the ovarian vesicle was manifestly ruptured. In another, who died four or five days after the cessation of the menses, the right ovary presented a vesicle still intact, but so distended that the slightest pressure made it burst. Lastly, in a young virgin, who died fifteen days after menstruation, there was no recent trace of a yellow body, and it could not be doubted that the Graafian vesicle had been arrested in its development. The subjects of these observations had all died a violent death in the midst of health.

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* "Recueil de faits pour servir à l'Histoire des Ovaires." Angers, 1858.

Thus, we may conclude that at each menstruation a Graafian vesicle assumes a marked preponderance over the rest, arrives spontaneously at maturity, and, generally, bursts at an indeterminate moment of this period, in order to expel the ovum it contains. But, nevertheless, in certain cases this vesicle may also remain stationary, or be totally absorbed. The double phenomenon is analogous to what is observed in other mammifera, during the rut.

Rœderer* observed that the ovaries grew towards the epoch of commencing menstrual life, and became atrophied at the menopause. He distinctly found that the atrophy of the ovaries was more marked and more closely associated with the cessation of menstruation than was the atrophy of the uterus.

If the ovaries are absent or ill-developed, girls do not menstruate, the breasts are flaccid or defective in development; the characters of womanhood do not become manifest. This may be said to be experimentally proved by the celebrated case of Pott. A girl, aged 23, of good constitution, went to Bartholomew's Hospital, in consequence of two tumours situated in the groins, which had for several months caused her so much pain that she could not attend to her work. She was healthy, and menstruated regularly. The tumours were soft, uneven, easily moveable, and lay externally to the tendinous apertures of the inferior abdominal wall. Pott determined to remove them. After dividing the skin, a thin membranous sac was found, in which a body was enclosed that was taken to be the ovary. It was removed, and the same operation was repeated on the other side. From this time forth she never menstruated, her breasts fell away, and the muscular system became developed as in man. Since ovariotomy has been so widely practised several cases have been observed in which both ovaries have been removed. In some of these, menstruation has continued to recur. Still it may be affirmed as a general law that when the ovaries are extirpated or become atrophied, menstruation does not reappear. Raciborski says the menses may be a little postponed, but that this does not always prevent the follicles from pursuing their regular course, and from accomplishing dehiscence. He has seen on ovaries of young girls one or two cicatrices, although they had never menstruated. Thus also women who had never menstruated have conceived. Whitehead relates cases. But these cases are very rare. Conception during lactation whilst menstruation is suspended is not uncommon.

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* "Icones Uteri Humani," 1779.

The first dehiscence corresponds with the first appearance of the menses.

Dr. Ritchie* also adduced evidence to show that ovulation may go on although there is no menstrual discharge. Negative observations, then, as to the menstrual flow do not prove that ovulation is also suspended; and ovulation is obviously the condition of impregnation.

Objections, however, to this theory have been urged by W. B. Kesteven† who may be said to have led a reaction against it. He insists that: "1. Menstruation is a *periodical* function of the uterus; 2. That ovulation is the *constant* function of the ovaries; 3. That ova are discharged at all periods of female life, in the intervals of, as well as at the time of, menstruation; 4. That ovulation and menstruation being often concurrent, indicates that they are both the result of the attainment of a certain point in the development of the female economy; 5. That the law of periodicity in the one not obtaining in the other, leaves still wanting the link in the chain of causation, whereby menstruation can be shown to be the effect of ovulation; 6. That at the menstrual periods the ovaries experience an extension of the uterine congestion, and become, equally with the uterus, the seat of increased functional activity."

These objections have been taken up by several German writers. The only fact of importance added to Mr. Kesteven's argument, is that several women have continued to menstruate after the extirpation of both ovaries. We are probably not yet in a position to set forth absolutely the relations of these functions to each other, and to other processes in the economy. That the relation is intimate is certain; the order of occurrence or precedence is uncertain. But the objections cited are less weighty than may be supposed. That ovulation should sometimes fail to evoke menstrual discharge does not prove that it is not the normal efficient factor; and the recurrence of menstruation after removal of the ovaries, is explained by the habit of periodicity acquired during the ovarian activity. This habit is seen in climacteric women who often have periodical hæmorrhages long after the atrophy of the ovaries and uterus. There is one remarkable circumstance which has not attracted the weight it merits in this discussion. It is this: Menstruation, the uterine function, is almost peculiar to woman; but ovulation is the universal law throughout the animal and vegetable world. The presumption is therefore overwhelming that it is the essential, the primary phenomenon. Another fact upon which I would insist is that in numerous cases pregnancy occurs at an early age, before the uterus, the nidus, is sufficiently developed for the accommodation of the ovum; and that in such cases abortion is the common issue. Analogous cases occur at the other extreme of sexual life; conception occurs when the uterus is undergoing the atrophy of reproductive extinction. Here again abortion is the frequent issue. Here we have evidence of attempted response of the infantile or the senile uterus to the ovarian stimulus. Since then, the ovary begins to act before, and continues to act after, the uterus is fit for its share in the work of reproduction, the presumption is strong that the ovary is the initiative organ, the *primum mobile* in generation. This view is further strengthened by the following observations of Professor Laycock: "When we remember the influence of the ovaria in exciting abnormal development of other structures connected with them, as the larynx, mammæ, and thyroid body, the changes which they undergo often resembling those consequent on pregnancy, we may hypothetically infer that similar changes may incur in an appendage having so close a connection with the ovaria as the uterus, and that an hypertrophy of that viscus may be produced, giving rise to all the phenomena of pregnancy, and originating in ovarian irritation." * Of so little importance indeed is the uterus that reproduction may be successfully carried through without a uterus. There are many examples of this in the animal kingdom; and the history of extra-uterine gestation proves the same proposition in woman.

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* "Ovulation during Amenorrhœa." *Ed. M. & S. J.*, 1845.

† "London Medical Gazette," 1849.

Nor must it be supposed that the phenomena of ovulation and menstruation are strictly local. In my Lumleian Lectures, and in various other writings, I have pointed out that menstruation, and probably ovulation also, are, like pregnancy, preceded and accompanied by, 1. Increased central nerve-irritability; 2. Increased vascular tension. There are three associated phenomena which strike the observer. A general increase of nervous and vascular tension; ovulation or the enlargement of the ovary; the development of the uterine mucous membrane and the menstrual flow. Do these phenomena, essentially concurring as they do in the accomplishment of one definite purpose, arise simultaneously; do they arise successively; and if they arise successively, what is the order of succession? Upon this question I am in a position to throw light. I have had the opportunity of observing in my ward at St. George's Hospital a case in which there was hernia of the left ovary. Thus the organ, naturally removed from direct observation, offered itself to continuous inspection. Observations were made —1. Of the vascular tension as tested by the sphygmograph; 2. Of the temperature; 3. Of the size, and other conditions of the ovary; 4. Of the appearance of the menstrual flow. The vascular tension was noted first; then the flow and the swelling of the ovary nearly simultaneously.

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* "Nervous Diseases of Women."

The following tracings (Figs. 59, 60, 61) are taken by Dr. Fancourt Barnes:—Fig. 59 shows the high tension preceding the menstrual flow, Fig. 60 shows the extreme high tension at the end of gestation. It is comparable to the high tension of chronic Bright's disease. Fig. 61 shows the ordinary tension after menstruation. The fall quickly follows the menstrual flow.

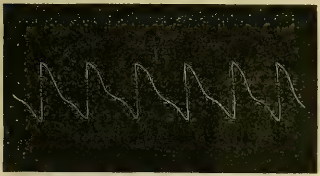

FIG. 59.

HIGH TENSION PRECEDING MENSTRUATION.

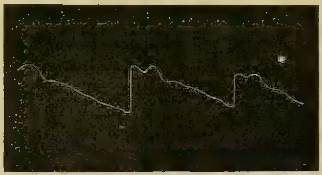

FIG. 60.

HIGH TENSION IN NINTH MONTH OF GESTATION.

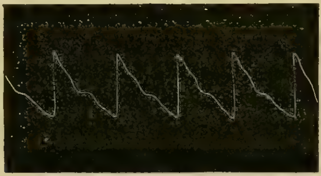

FIG. 61.

AFTER MENSTRUATION; TENSION FALLEN (AFTER FANCOURT BARNES).

Amongst the latest investigations that have attracted attention are those of Kundrat and Engelmann.* These authors consider that the menstrual hæmorrhage is a retrogressive process, under which the superficial layers of the mucous membrane, having undergone fatty degeneration, are being exfoliated. It would follow from this view that with the appearance of the menstrual hæmorrhage the generative processes of the period are brought to a close, and that a conception occurring at any moment after this time, must be due to a newly-discharged ovum which imbeds itself in the mucous membrane as it is newly formed. They, however, appear to overlook the general nervous and vascular tension, an essential factor in the process. And the analogy they assume between fatty degeneration of the mucous membrane in connection with menstruation and fatty degeneration of the placenta at the end of gestation fails, by the fact that the placenta does not, under normal conditions, undergo fatty degeneration. The theory that the placenta underwent fatty degeneration preparatory to labour was started by Druitt whilst studying my original researches. It is disproved by observation, and is at variance with physiology, since vessels in degeneration would become unfit for their function, and this at a time when the function is at its highest pitch, and calling for perfect integrity of tissue.

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* Stricker's "Med. Jahrb.," 1873.

Menstruation, then, is the natural epoch for the escape of ova; and, consequently, it is the most favourable to conception. But a question of great interest is attached to this conclusion. Do the epochs of ripening and of the natural fall of the ova always and of necessity return in a regular manner? That is, are there not other influences besides the rut and menstruation, capable of hastening the epochs of maturation and fall of the ova? This must be answered in the affirmative. Thus, the pigeon in its wild state lays eggs only once or twice a year, whilst in our pigeon-houses it lays seven or eight times. Hens, whose eggs are taken away from them to prevent their sitting, lay almost every day for eight months in the year. The rabbit, which, in a state of liberty, has only one or two litters a year, has perhaps seven when its young are taken away at a suitable time. The period of maturation, then, far from being immutable, appears to depend upon certain conditions which may accelerate or retard it. Similar conditions exert similar influences in woman; and there is reason to believe that sexual intercourse may hasten the maturation of ova, and especially their escape from the ovary.

Admitting, however, as we must, the occasional operation of disturbing circumstances, the general law is that these phenomena are reproduced periodically; and that during the periods when they are manifested certain signs attend, which in the aggregate bear the name of *menstruation.* Consequently the ripening of ova, and most frequently their dehiscence, are revealed outwardly by the *appearance of the catamenia.*

We may now conveniently study this function from a clinical point of view, fixing our attention mainly upon those phenomena which are open to direct observation. Pouchet* has distinguished the different phases of menstruation with great precision, by defining its different periods, and by comparing, by help of the microscope, the discharges attending it with those of the intermenstrual period.

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* "Théorie Positive de l'Ovulation Spontanée." Paris, 1847.

Characters of the Menstrual Discharge.—The *first* sign of the advent of the menses is the manifestation of a particular odour imparted to the mucus secreted by the sexual organs. The second sign is a change of colour of the utero-vaginal mucus; at first, dull white, it becomes brownish; some blood-discs, mingled with numerous mucous globules and fragments of epithelium, floating in the liquid account for this change of colour. The first period lasts one or two days. Sometimes it immediately precedes the flow of blood; sometimes the mucus becomes normal again; then, after an interval of a day, blood, almost pure, suddenly escapes from the vulva.

The flow of ruddy blood constitutes the *second period.* The fluid secreted is composed of blood, not differing from arterial, mixed with vaginal mucus. By the microscope we find mucous globules in various stages of development, thin fragments of transparent epithelial scales, mixed with innumerable blood-discs. This flow usually ceases in three or four days; but in some women it is continued for seven or eight days, without obvious departure from the physiological condition.

The menstrual blood differs from pure blood, in not coagulating; that is under ordinary conditions. Dr. Whitehead explained this by showing that the vaginal mucus has an acid reaction, and that contact of the blood with this acid prevented its coagulation. Donné also says that menstrual blood is acid, containing phosphoric and lactic acids. Mandl, however, showed that the smallest quantity of pus or mucus stopped blood from coagulating. Now, the menstrual discharge is blood mixed with mucus. That admixture with mucus accounts for the fluidity of the menstrual discharge may be admitted; and so long as the quantity of blood is within normal bounds, the proportion of mucus supplied is sufficient; but if the blood be in excess, and if it be retained a little while, it will coagulate. Thus it is that in menorrhagia clots are frequently passed.

The quantity of the blood exhaled becoming less and less abundant, its colour changes from red to brown, the proportion of blood-discs diminishes, whilst that of the mucous elements increases; at length the mucus itself becomes thinner. It is especially at the end of this period that the Graafian vesicles may burst spontaneously.

When the menstrual discharge has ceased, the internal surface of the uterus, and also that of the vagina, cast off numerous epithelial scales, at first nearly entire, but soon reduced to fragments of more or less tenuity. These scales or *débris* constitute during the first intermenstrual days the greater part of the solid elements contained in the excretions by the vulva; the rest is composed of a variable number of mucous globules. Virchow insists that the detachment of the uterine mucous membrane is more complete than is generally supposed, and that in normal menstrual blood heaps of cells are often met with, which by their structure reveal their origin in the uterine glands.

As in women who have already menstruated, the menses are preceded by a modification in the quantity and colour of the normal secretions; so in the girl, who, having not yet menstruated, has arrived at puberty, the menstrual hæmorrhage is often preceded by a serous whitish or brownish discharge. This discharge may anticipate by several months the appearance of the blood, and may recur several times before this makes its appearance. Often also after the first sanguineous discharge in a young girl, several months may intervene before the menses set in.

The similarity of the phenomena attending the first advent and the climacteric cessation of menstruation is especially deserving of note. There is, 1. Irregularity as to periodicity. 2. Occasional excess of blood-loss, amounting to hæmorrhage. 3. Alternate enlargement and subsidence of the abdomen. 4. Pain and induration of the breasts.

The quantity of blood discharged at each epoch varies in different women, and in the same woman under different circumstances. It usually ranges from three to four ounces. Generally it is more abundant in women living in luxury. And, according to Burdach and Brierre de Boismont,* it is more copious in hot than in cold countries. Our countrywomen in India are more subject to menorrhagia than when in England.

A vulgar error still prevails that the menstrual blood has fœtid or even poisonous properties. This is only true under the conditions of retention, of uncleanliness, or admixture with the products of disease.

The Source of the Menstrual Blood.—Haller was aware that it came from the womb. Observations in point have been made under two different conditions; that is, in the living and in the dead. First, the uterus examined in cases of complete prolapsus, and where there is no prolapsus, by the speculum, blood is seen to issue from the os uteri; and in cases where the uterus is turned inside out the menstrual blood is seen directly oozing from the mucous membrane of the body of the uterus. Secondly, on examining the bodies of women who have died during menstruation, Coste and others, myself among them, have seen the vascular apparatus of the uterus developed and injected in an extraordinary manner. The vascular structure of the mucous membrane, in particular, forms on the surface, under the fine layer of epithelium which covers it, a beautiful network, each mesh of which encloses a glandular tube. This vascular reticulation is so marked and rich that it gives a more or less deep violet tint to the inner surface of the uterus. According to all probability it is through the walls of these ramuscules that the menstrual blood oozes. "In one case," says Coste, "death took place exactly at the moment when the blood began to ooze through the engorged vessels. There were seen in the course of these vessels an innumerable multitude of small red points, as if the mucous membrane had been pricked with a fine needle, each prick giving issue to a minute droplet of blood. Here and there, under the epithelium, were small ecchymoses, indicating that the hæmorrhage, suspended by death, had not yet made a complete escape. In other women the phenomenon being more advanced, the cavity of the uterus was found filled with red fluid blood, about to escape by the neck."

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* "De la Menstruation dans ses Rapports Physiologique et Pathologique.' Paris, 1842.

Some experiments made by Matthews Duncan, to determine "the power of the uterus to resist a bursting pressure" (1868), seem to me to find application here, Air was forcibly driven by a pump against a piece of uterus stretched over a tube. "It was curious," he says, "to observe the permeability of all the unruptured tissues to this fluid." The experiments being performed under water, the air bubbled up, or effervesced from the peritoneal surface by innumerable minute points. In all probability the mucous membrane of the uterus and the delicate coats of the blood-vessels offer even less resistance under the hydraulic pressure to which they are subjected by the increased local turgescence and general vascular tension attending menstruation. This oozing from a free surface is a protection against extravasation in closed cavities or tissues, which could not fail to be injurious.

This intense vascular engorgement involves the ovaries and Fallopian tubes as well as the uterus; and there is no doubt that blood is effused from the whole tract of the tubo-uterine mucous membrane. Dr. Letheby (*Phil. Trans.*, 1852) describes the microscopical characters of the menstrual fluid found in the tubes in the bodies of two young women who died whilst menstruating. The preparations are in the London Hospital.

Periodicity.—The typical periodicity is every twenty-eight days. In many women the return is exact to the day. There is, however, a range of variation in different women; in some the interval from the commencement of one menstruation to the return of the next is less than twenty-eight days, in others more rarely exceeding thirty days; that is, if strict periodicity be observed. In women whose intervals vary, being sometimes more, sometimes less than twenty-eight days, some pathological element probably exists.

The Age at which Menstruation begins.—In temperate climates, between the ages of thirteen and fifteen, concurrently with the appearance of other signs of puberty, as the growth of hair on the genital parts, and the swelling of the breasts, the menses begin to flow. Here, again, there are considerable variations. Cases are recorded of menstruation beginning at ten, and even as early as seven or six years of age. These must be regarded as instances of quite exceptional precocity. Retardation is more common; cases are not infrequent of the first appearance, or at least, of the fair establishment of menstruation, at sixteen or seventeen. In these there is mostly some pathological condition. Since the outbreak of this function of the uterus is a symptom or consequence of the entry into active function of the ovary, it may be concluded that whatever causes hasten or retard the evolution or ripening of the ova, will have a corresponding effect upon menstruation.

Hence luxurious living and libidinous excitement tend to forestall the ordinary period, whilst the contrary conditions of hard living and freedom from sexual emotion tend to postpone it.

Climate has been said to have a powerful influence. The observations of Brierre de Boismont and others seem to have proved that the advent of menstruation is decidedly earlier in hot climates than in cold. And common observation proves that, tested by their physical and intellectual characters, girls pass into womanhood at a somewhat later age in cold and temperate climates; whilst the women in hot climates fall at an earlier age into sexual decrepitude.

In Siam, according to Dr. Campbell (*Edin. Med. Journ.*, 1862), some girls arrive at puberty at twelve, but the more usual ages are fourteen, fifteen, and sixteen. Dr. Goodeve gives about twelve as the mean, and Dr. Leith, of Bombay, twelve and a half. But of a series of cases tabulated by him, the largest number menstruated after fourteen. In Germany Schroeder says menstruation generally begins at fifteen, and ends at forty-five. According to Louis Mayer, brunettes begin earlier than blondes.

The influence of cold is further seen in the character of the menstruation. Thus, Dr. McDiarmid, surgeon to Sir John Ross's Arctic Expedition, says that amongst the Esquimaux, menstruation is often delayed until the twenty-third year, and then only appears scantily during the summer. I also know women of feeble sexual development who menstruate in the summer only; and others who menstruate in India and not in England.

Probably, *race* may have as much to do with the period of advent of menstruation as climate. Observation of the Jews, who are to be found in almost every climate, might determine this question, and thus enable us to appreciate more accurately the influence of climate. Is the first appearance of menstruation amongst the Jews inhabiting different countries uniform or not?

Many cases of *precocious menstruation* are recorded. In some, the common signs of puberty appear to have been almost congenital. These cases form a class distinct in some features from the premature menstruation which appears at from nine to twelve years of age. Dr. Harris, of Washington (*American Journal of Obstetrics*, 1871), discusses the subject. Sir Astley Cooper narrates the history of a child which commenced to menstruate at three years old, and was last noticed by him when seven years and five months old; at this early age she had all the appearance of a thick-set stunted woman; she measured four feet one inch, and had so large a pelvis that she could no doubt have given birth to a child (*Lond. Med. and Phys. Journ.*, 1810). Le Beau mentions a similar case (*Annales d'Hygiène*, vol. x.). In the case of infantile puberty, the ribs and pelvis are excessively developed, and shortness of stature results. Where menstruation begins at eight or afterwards, the growth of the body is not usually interfered with. Bouchut adds a more recent observation:* N. O., born on 27th January, 1872, in London. Menses appeared at twenty-two months, and since every four weeks, equal in amount to that of adults. The appearance is preceded by *malaise;* she says "the abscess is going to burst." On the 16th April, 1876, the breasts are large, completely formed; there is a marked increase in their size at every menstrual epoch. There is down on the pubes, and there are other marks of development. A similar case is related by O. Wachs.† He also gives a fairly complete summary of the cases recorded by others.

That early menstruation depends upon early ovulation is further proved by the occasional occurrence of very early pregnancy. Several well-authenticated cases of girls being mothers at thirteen, or even twelve years old, are recorded. Dr. Roberton tells of a girl, working in a cotton factory, who was delivered of a full-grown child when only a few months advanced in her twelfth year. She had menstruated before falling pregnant. Mr. Smith, of Coventry, relates (*Record of Obstetric Medicine*, vol. i.) the case of a girl who at twelve years and seven months gave birth to a full-grown healthy child. She began to menstruate at the age of ten. Dr. J. G. Wilson reports (*Edin. Med. Journ.*, 1861) the case of a girl who began to menstruate when twelve years and six months old in January and until April. She was delivered of a full-grown child at thirteen years and six months.

In several cases of premature menstruation, exhaustion and death have occurred (Clifford Allbutt, *Med.-Chir. Trans.*, 1866).

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* "Paris Médical," 1876.

† "Zeitschrift für Geburtsh, u. Gynäk." 1877.

But this is not the rule. Kussmaul says precocious menstruation is sometimes the result of disease, especially of new growths in the ovary.

The period of disappearance of menstruation is more uncertain than that of its commencement. Usually about the age of forty to forty-five some irregularity begins. But the function often continues with complete regularity until forty-five and sometimes fifty, and even beyond. The instances, not infrequent, in which periodical discharges of blood, not distinguished by the subject from ordinary menstruation, are continued much beyond fifty, may, with considerable confidence, be suspected to be due to some abnormal condition. This is especially true when the issue of blood is greater in quantity and lasting longer than the subject had been accustomed to observe; and the presumption that some disease, local or remote, is present, is very great when profuse losses of blood, periodical or not, break out after the menstruation has ceased for some months.

It is a popular belief that, if a woman begins her menstrual life at an early age, she will cease to menstruate at an earlier age than those who begin later. Another mode of expressing this theory is to say that the epoch of menstrual life, that is, of active ovulation, and hence, of aptitude for conception, lasts for thirty or thirty-five years. Négrier's observations, however, seem to prove the reverse. He says: "It seems well proved that the ovarian function, creative of germs, is prolonged in life in direct ratio of the volume of the ovaries and of the precocity of ovulation; thus, the girl, nubile at twelve, will continue menstruating until fifty, or even fifty-five; whilst the girl who did not menstruate until eighteen or twenty, a fact which reveals feeble development and small energy of the organ, will cease to menstruate at forty, an early age." Considerable departures from this limit are probably due to some morbid disturbing element; and in many cases the departures are more apparent than real. For example, at the commencement, although no sanguineous discharge may mark the onset or establishment of menstruation for several months, or a year or two, there is no doubt that ovulation, the essential motive of menstruation, goes on. This is proved by cases in which pregnancy has occurred without menstruation. In other cases, a leucorrhœal discharge, "white menstruation" it might be called, returns periodically, attended by the usual indications of menstruation. In a third series of cases, even the white discharge may be wanting, and still a sluggish kind of ovulation may occur. This is observed in some forms of amenorrhœa.

At the other end of the history we sometimes find menstruation ceasing at a comparatively early age; that is, before forty, even at thirty-seven or thirty-six. These can hardly be instances where the allotted thirty years have run out, from having begun prematurely. Most frequently the explanation is that ovulation, or its exponent, menstruation, has been prematurely arrested by some intercurrent condition of the ovaries or of the uterus. Sir James Simpson described a condition in which the ordinary involution of the uterus which follows delivery, seems to pass the physiological bounds, and to proceed to positive atrophy, thus ushering in a premature senility. Whatever the explanation, I can attest the fact that women who have borne a child at thirty-six or thirty-seven have henceforth never menstruated or conceived again. In most of these women I have found the uterus reduced below its normal bulk, and presenting the other features of the senile uterus, whilst the breasts also, which obey so closely the impulse of the ovaries, have shrunk; these women are overtaken by an early climacteric.

In not a few instances, however, the explanation of Négrier holds good, namely, that the early cessation of menstruation is due to original feeble ovarian development. In these women the menstrual excretion is scanty and appears late; their languid genital capacity is exhausted long before the normal epoch.

In other instances the premature failure is due to the exhausting influences of disease.

The most distinct evidence that healthy menstruation may be protracted beyond the age of forty-five is drawn from the fact that pregnancy occasionally takes place after that age. But many of the cases of alleged child-bearing at advanced age are apocryphal. My own observation is in accord with the conclusions of Fordyce Barker.* He met in his own practice a lady born May 5th, 1801, who was delivered May 6th, 1852, and again in June, 1853. He knows two other women over fifty who became mothers. Dr. Barker says: "After the most careful and laborious research, I can find but one authentic case, based on the evidence of a reputable medical man, who carefully investigated the documentary proof, where a woman who had reached the age of fifty-five has given birth to a child. This case is recorded by Dr. Davies, Hertford, England (*Lond. Med. Gazette*, vol. xxxix.). I feel warranted in stating the proposition that the laws of physiology, the experience of mankind, and the decisions of courts of law justify a medical man in declaring that a woman over fifty-five years of age is past the period of child-bearing."

Vicarious or ectopic menstruation occurs when hæmorrhagic discharges take place periodically from other organs than the uterus. The occurrence of this remarkable phenomenon is evidence of the force of the periodical habit. It seems as if every month a state analogous to plethora, or an accumulation of blood, arose, which must be relieved by evacuation. It is evidence of the high arterial tension attending menstruation. The active physiological process going on in the ovaries naturally determines the blood-current in especial force to the pelvic organs; hence the uterus is the natural evacuant organ. It is a remark made by Trousseau, that all the physiological discharges of blood take place from mucous membranes. A happy provision, for mucous membranes all lead to external outlets. It will generally happen, then, when the mucous membrane of the uterus is not disposed to execute its functions, that some other mucous membrane will supplant it. The most frequent seat of vicarious menstruation is the Schneiderian membrane. In young people especially, epistaxis is easily excited. Certainly *menstrual epistaxis* is a quasi-physiological phenomenon, which should be checked only with great circumspection. In some cases I have known epistaxis to accompany the ordinary menstrual discharge from the uterus; thus supplementing, not supplanting it.

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* "Philadelphia Medical Times," 1874.

Various parts of the alimentary canal may assume the work of the uterus. The stomach is perhaps the most frequently called upon. Thus we have *menstrual hæmatemesis.*

Hæmoptysis is occasionally a manifestation of vicarious menstruation. The right appreciation of this condition is obviously of great importance, lest it be misinterpreted as a symptom of tubercular mischief.

Other parts may, however, do similar duty. Thus we occasionally see *hæmorrhage from the rectum.* And towards middle age, when hæmorrhoids are not uncommon, these bleed more freely at the menstrual periods.

I have notes of cases in which menstrual hæmatemesis seemed to be hereditary. In some there is a distinctly hæmorrhagic diathesis, as in the following instance: A young lady, aged twenty-four, had several attacks of hæmatemesis more or less profuse, and at last one which was so severe and protracted that she made a very narrow escape with her life. It appeared to be connected with menstrual deviation. She recovered fairly; but six months later, just when menstruation was due, having felt sick, and oppression at the stomach, she vomited a small quantity of dark blood, the menses appearing at the same time scantily. She never suffers dysmenorrhœa. A sister, when sixteen, who had hitherto menstruated scantily, had hæmatemesis at her periods. A brother, aged five, died of epistaxis after purpura. The father died of epistaxis at fifty-six, caused, his wife says, by intemperance, which produced epilepsy. Whenever he had a fit he had hæmorrhage.

The *conjunctiva* is another mucous membrane which evinces a particular proclivity to pour out blood vicariously. I have seen a woman who every month suffered profuse ecchymoses of both eyes, some blood escaping from the surface, and some being effused under the conjuctivæ, to be gradually absorbed, and passing through all the stages of ecchymosis of the eye from direct violence.

Liebreich has figured in his *Ophthalmoscopic Atlas* (Plate VIII., English edition, 1870) an example of *retinal hæmorrhage* after suppression of menstruation.

The *skin* is not infrequently the seat of vicarious menstrual hæmorrhage. Sometimes the blood appears in the form of petechiæ or small ecchymoses on various parts of the body; sometimes it has been seen to ooze from the surface, forming a true bloody sweat. There seems some analogy between these cases and the bumps of *erythema nodosum,* which are not uncommon on the legs of girls suffering from amenorrhœa.

In some instances the blood is poured out from a *varicose ulcer or other sore.* Dr. Mason relates (*Edin. Med. Journ.,* 1866) a case in which menstruation began at eight, and continued to recur until eleven, then stopped until thirteen. A large abrasion then formed in the right cheek, suppurating in the centre, and inclining to bleed towards the circumference. The menstruation was now irregular. After a time this place healed; blood then oozed from the skin of the face.

Dr. Bassett relates (*Presse Médicale*) a case of periodical discharges of *blood by the nipples.* Menstruation, however, was also present, although scanty. The patient had borne three children. In 1876, I saw a girl, aged thirteen, at St. George's Hospital, who had vicarious menstruation by vomiting, and also oozing of blood from the nipples. Mr. d'Andrade relates a case.* The subject was a stout, healthy Parsee lady, aged eighteen. She had menstruated regularly from thirteen to fifteen and a half, when the catamenia became first irregular, then ceased, being replaced by bleeding at the gums and nose, and vomiting of blood. Menstruation returned. No pregnancy. Mr. d'Andrade observed blood to ooze from the healthy skin of the left breast, and of the right forearm. The blood exuded showed red and white globules under the microscope. The skin-hæmorrhage recurred every month or two. Subsequently blood oozed from the forehead.

The following case,† which occurred in St. George's Hospital under Dr. John Clarke, is especially instructive in its physiological and pathological bearings:—"J. C——, single, aged eighteen, admitted May 30th, 1872. Had never seen any catamenial discharge; for three months before admission she had from time to time suffered pain at the lower part of the back and between the shoulders. During these attacks of pain she had bleeding from the nose and gums, which lasted about a week, and then ceased, returning again after the lapse of one month. For two or three weeks before she came into the hospital she had had great irritability of her skin, to relieve which she had recourse to scratching; but this gave rise to immediate bruising of the parts. For four months past she had complained of pain in the left side, accompanied with difficulty of breathing, cough, and spitting of blood. She had never had rheumatic fever; but about five years ago she suffered from chorea. On admission she was very anæmic, the lips and conjunctivæ being almost bloodless. She suffered from shortness of breath, and had frequent bleedings from the nose, mouth, and skin. There were hæmorrhagic spots on the tongue, inside the lips, and on the gums. Some of the spots on the tongue were as large as half a split pea, and the tip was so covered with ecchymoses that it had the resemblance of a strawberry. The surface of the chest was more or less marked with these hæmorrhages, but here some of the spots could be picked off. On the legs and thighs the spots had more the character of purpura. In many places the blood seemed to have actually exuded from the skin. For four or five days she had suffered from epistaxis. On examining the chest, a loud mitral murmur, most marked at the apex, was heard, the heart's action being very irregular and rapid. The lungs were resonant, and air freely entered; but the breathing was rapid and laboured even after slight exertion. There was a troublesome cough, and occasionally the patient spat blood. There was no vaginal orifice; the small cavity representing the canal of the vagina ended in a cul-de-sac, and was not deep enough to hold a teaspoonful of fluid. The urethra was in the middle of this cavity. The labia majora were well formed, but small, and there was an ordinary amount of pubic hair. The space between the rectum and the urethra measured about half an inch. On passing the finger into the rectum, no uterus could be discovered; and, when a catheter was introduced into the bladder, it could be distinctly felt through the anterior wall of the rectum. Numerous ecchymoses were present on the inner side of the labia majora.

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* "Trans. of Med. and Phys. Soc. of Bombay," Bombay, 1862.

† "Lancet," 1872.

"The patient continued to improve till June 11th, when the breathing became much embarrassed, and accompanied with severe palpitation, cough, and spitting of blood, death taking place at 3 p.m., consciousness remaining till the last.

"*Autopsy.*—Body well nourished; limbs and trunk covered with ecchymoses. Mammæ fairly well developed, but nipples small. Colour of the hair light brown. On opening the thorax the pleuræ were found to be spotted with ecchymoses. The lungs were œdematous, and gorged with blood. The pericardial cavity contained a little light-red fluid, but the walls were dotted with hæmorrhagic spots, especially the visceral wall. The endocardium at the upper part of the left ventricle was thickened and opaque. The aortic valves were thick, puckered, and inefficient; the mitral valve thickened, and so contracted that the orifice would only admit the tip of the little finger. The right ventricle and left auricle much hypertrophied. The liver, spleen, and kidneys presented no abnormal appearance. The ovaries were very well developed and congested, and contained a recent false corpus luteum. The uterus was absent (evidently congenitally), only a small nodule of fibrous tissue being found in the folds of peritoneum between the rectum and the bladder."

Here we see exhibited in a striking manner the influence of ovulation upon the system. There being no uterus, the menstrual blood sought outlet in almost every direction, and the function failing, the patient died. The case is valuable, as showing that absence or imperfect development of the uterus does not imply defective development of the ovaries.

I have seen other examples of the influence of the general law of vascular tension seeking relief by extraordinary means when normal menstruation fails. Subjects of amenorrhœa, it is known, often have œdema of the legs and face. I have seen œdema recur periodically, that is, vicariously. This is of course more likely to be the mode of relief selected when the quality of the blood is deteriorated. But in one case specially noted, there was no anæmic sound.

These cases of vicarious menstruation prove how intense is the effort of Nature to seek an outlet for blood. They seem to show that the general tension of the vascular system becomes greater when the outlet by the uterine mucous membrane is not free. This general tension is illustrated by the frequent sensation complained of by sufferers from amenorrhœa and dysmenorrhœa, of "those things flying to the head," evidenced by headache, vertigo, and epistaxis. These phenomena of vascular tension suggest that the rational treatment consists in diminishing tension by purgatives and leeches, or by cupping. It seems in high degree probable that in the struggle of the circulation to find relief from the menstrual tension, the ordinary vicarious safety-valves may sometimes fail; that then the internal organs, as the brain, lung, liver, kidney, spleen, have to bear the strain, and that thus the foundation of structural organic disease may be laid.

Two conditions in the healthy subject *suspend menstruation* —Pregnancy and Lactation. The arrest of menstruation is the most familiar presumptive evidence of pregnancy. The law is, that from the moment of conception menstruation is stopped, and does not return until the child is weaned. Many exceptions, however, occur. When pregnancy occurs, the lining membrane of the uterus, being wanted for the new function of connecting the impregnated ovum with the uterus, undergoes a remarkable change of structure. If it were now to pour out blood, the relation of the ovum to the uterus would be disturbed, and abortion would ensue. In fact, this not seldom does occur. Notwithstanding the general truth of the theory of the Genesial Cycle, so well described by Tyler Smith, which expresses the law of the successive domination of the ovaries, uterus, and breasts in the woman, it is certain that, although during pregnancy and lactation the ovaries are comparatively subdued or quiescent, ovulation occasionally, if not always, goes on. Négrier and Scanzoni have especially insisted that pregnancy does not arrest ovulation. If in the majority of cases we miss the common proof or exponent, menstrual discharge, yet the other signs of ovarian activity are frequently present. There is a monthly molimen or nisus, marked by greater turgidity and accumulation of blood in the pelvic organs. Hence the epochs when the return of the menses is due are those when abortion is most likely to happen. The influence of ovulation is also seen in the later months of gestation, markedly when the placenta grows to the lower or cervical zone of the uterus. In this case hemorrhages are apt to break out at the menstrual epochs; and generally premature labour is more likely to occur at these than at intermediate periods.

But menstrual hæmorrhage may occur, especially during the first three months of *gestation,* without interfering with the relations of the ovum to the uterus. This may be explained in two ways: First, the blood may be poured out from the free surface of the decidua vera lining the inferior zone of the uterus, and even from the free surface of the decidua reflexa. Secondly, it may exude from the congested cervical cavity. This is especially likely to occur when there is ulceration or abrasion of the os or cervix, or inflammatory congestion. During pregnancy, when the uterine mucous membrane is barred against hæmorrhagic response to the ovarian excitation, I have seen many instances of hæmorrhage from the mucous membrane of the stomach, intestines, nose, lungs, and even the bladder. In these cases the ectopic eruption of blood is not necessarily due to the suspension of the ovarian function or to an altered condition of the uterine mucous membrane. It is rather to be ascribed to the high vascular tension of pregnancy.

Menstruation during lactation is much more frequent than during gestation. Although, normally, the breasts are now in the ascendant, the ovaries are not always dormant. Many women really menstruate throughout lactation, and not infrequently, in spite of suckling, pregnancy occurs. In the majority, perhaps, menstruation is in abeyance for nine, ten, eleven, or twelve months, if suckling is kept up. Some women, hoping to postpone pregnancy, go on suckling for fifteen, eighteen, or even twenty-four months. Only a certain proportion succeed in their object. After nine months the ovarian excitement usually becomes too strong to be subdued by the more languid activity of the breasts; menstruation reappears, the milk dries up, and pregnancy often quickly follows. Where from the child being still-born or other causes, suckling is not undertaken, the first menstruation commonly appears a month after the labour, thus giving evidence of the labour being determined by an ovarian stimulus.

In other suckling women, however, the menstruation is chiefly apparent. Discharges of blood, simulating menstruation, may have the significance of hæmorrhage, a subject discussed in a preceding chapter. In very impressionable or nervous women, the mere act of applying the child to the breast will cause a discharge of blood from the uterus, offering one example of the many of the intimate correlation between the ovaries, the uterus, and breasts.

It is convenient here to notice the *influence menstruation exerts upon the milk.* It is generally believed that the milk is injuriously affected; and common observation shows that the suckling is often griped, or has diarrhœa, at the nurse's monthly periods. Raciborski, indeed, says the milk is not sensibly altered in its properties; it simply appears to be less rich in cream. I have, however, observed that colostrum-globules were reproduced at every menstrual epoch. And it must be borne in mind that the activity of the ovaries renders the nurses more susceptible to moral impressions and to emotions. The influence of emotion in disturbing the milk cannot be doubted. In the contention for supremacy the ovary is pretty sure to win. If the woman is exposed to sexual relations, active ovulation and menstruation are very likely to be quickly resumed. Thus, in spite of suckling, impregnation often occurs within two or three months of delivery; and not a few women fall pregnant within six months "without seeing anything between." On the other hand, women who have become widows before or soon after delivery, and lived a single life afterwards, out of a feeling of concentrated affection, keep up lactation for eighteen months or two years without a return of menstruation. But this, perhaps, they could not have done had the ovaries been subject to the excitement of married life.

As a rule, nursing women continue unfruitful until the activity of the mammary secretion has remitted, this remission being shown by the necessity of adding foreign substances to the infant's food.

We may now attempt to trace the local and constitutional reactions, that is, *the symptoms or concomitants of menstruation.* First, *the local conditions.* There is congestion or hyperæmia of all the genital system; ovaries, uterus, and breasts swell and become turgid. Scanzoni had an opportunity of directly observing this. In a remarkable case of inguinal hernia, the contents of the sac included the uterus and ovaries. He found these organs to swell and become painful to the touch at every menstrual period. Conception took place twice whilst the uterus was in the sac (Beiträge, 1871). I have noted ovarian swelling. Many women are conscious of a sense of fulness, weight, and pain in the region of the ovaries. Then there is the evidence of *post-mortem* inspection of the ovaries of women dying during menstruation, which shows them to be full to the point of bursting with blood. Indeed, when an ovum escapes there is an actual rent in the capsule of the ovary; in some cases, phenomena in a certain sense traumatic, as severe pain, a kind of shock, are present.

The state of the uterus has been partly described. The mucous membrane overgorged, actually allows blood to ooze from its surface. The bulk of the uterus is increased. This may be determined by its greater weight as ascertained by touch, and by examination between the two hands. The vagina also is more vascular and turgid.

The breasts sympathize with the pelvic molimen. They swell visibly, become firmer, sometimes painfully hard. This is especially the case at the age when menstruation is being established. Under the ovarian stimulus the breasts, like the uterus, actually grow; they assume their full development or evolution. So great is the activity thus provoked, that, occasionally, this rapid, almost sudden, action passes the physiological boundary; the glands present nodular masses, extremely tender to pressure; they may even inflame, and I have seen these phlegmons form abscesses in the breasts of virgins, produced apparently under this sole ovarian excitation. This is in strict analogy with the history of the production of phlegmons in the breast after labour. I have, however, suspected, in some cases, that libidinous manipulation of the breasts was concerned. The formation of abscesses is, indeed, rare; but it is not rare to find at puberty nodular painful points in the breasts, which give rise to great anxiety as to their real nature. Howsoever rare and improbable cancer of the breast may be in young girls, it is not always easy to allay the apprehension that it exists. Mere surgical examination is not always enough to establish a decisive diagnosis, affirmative or negative. At any rate, I have known surgeons of great experience at fault in these cases; and it was only on further consultation that, in two instances, I rescued the patients from undergoing needless amputation of the breast. In considering these cases, then, we must make great allowance for the physiological stimulus, and deliberate well, calling Time, which solves so many problems, into consultation.

These local conditions are usually well marked throughout menstrual life. But the remote or induced phenomena are generally more strongly characterized at the first appearance of the function. The following description, however, whilst it applies more strongly to the first menstrual periods, will serve, with modifications in degree, for the subsequent menstrual history.

The vascular excitement of the genital organs cannot fail to affect other parts of the body and the general system. The nervous centres, especially, feel and respond to the altered condition of the genital system. Here we must recall to our attention the two conditions to which I have already adverted: 1st. The augmented central nervous tension. 2ndly. The augmented central and general vascular tension. These conditions explain many of the physiological and pathological phenomena.

In most instances, there are prodromata, forerunning signs, the significance of which is well known to the subject. These, like the signs which occur at later stages, will vary in different individuals. In women whose health is good, whose organs are perfectly adapted to the easy performance of their function, the prodromata are scarcely noticed, and all the phases of menstruation are gone through with little or no local or general disturbance. In such persons a slight sense of fulness in the pelvis, some little perturbation of the circulation, signs suggesting plethora, are speedily followed by the flow which brings complete relief. All sense of trouble passes away with a momentary lassitude, that does not compel to the interruption of ordinary duties. Such persons are often more cheerful and animated at the menstrual periods; their ideas flow more brightly; their emotions are more kindly.

But in many women things do not run so smoothly. The function is performed with more or less difficulty, and is attended by more or less general disturbance. This may arise from one of two, or a combination of the two, circumstances. The subject may be of an excessively impressible temperament, stirred too readily and immoderately by ordinary excitation. Or, secondly, there may be local mechanical, or other hindrances to the fulfilment of the menstrual acts. Or the two conditions may be combined. In either of these cases, not only may the prodromata be severe, but the stage of menstruation itself will be attended with suffering, and, even when the function is fairly completed, distress will not be altogether allayed.

Amongst the prodromata are pain in the pelvis, a sense of fulness, backache, pain especially in one iliac region, and radiating down the thighs. The alimentary canal reveals the impression made upon the ganglionic centre by vomiting and diarrhœa. Lassitude, to the extent of prostration, seizes the patient. The mind is always more or less disturbed. Perception, or at least the faculty of rightly interpreting perceptions, is disordered. Excitement to the point of passing delirium is not uncommon. Irritability of temper, disposition to distort the most ordinary and best meaning acts or words of surrounding persons, afflict the patient, who is conscious of her unreason, and perplex her friends, until they have learned to understand these recurring outbursts. Despondency to the verge of melancholy, violence to the verge of mania, impulse ungovernable to the verge of monomania, false ideas, distorted judgment to the verge of delusion, and sometimes overstepping the boundary, render the sufferer for a time really irresponsible. Lunatic asylums offer numerous examples of comparative abeyance of the usual manifestations of insanity during the intermenstrual periods, and of their exacerbation when the catamenia return. Not even the best educated women are all free from these mental disorders. Indeed, the more preponderant the nervous element, the greater is the liability to the invasion. Women of coarser mould, who labour with their hands, especially in outdoor occupations, are far less subject to these nervous complications. If they are less frequently observed; if they less frequently drive refined women to acts of flagrant extravagance, it is because education lends strength to the innate sense of decorum, and enables them to control their dangerous thoughts, or to conceal them until they have passed away.

In other cases the ovarian excitation evokes a fit of what is called hysteria. This, too, is sometimes to a great extent kept in subjection by a determined will; but when once this habit has grown, the attack is usually irrepressible. I, as well as other physicians, have observed cases in which a fit of eclampsia has ushered in menstruation. In some of these there existed an hereditary or other predisposition to this form of convulsion; but still the exciting action of ovulation was clear. Sometimes stupor or lethargy is the prominent symptom, but this is more frequent as a result of hysteria or eclampsia. Associated occasionally with hysteria, or independent of it, erotic passion is the prominent symptom. When this occurs, the lapse into insanity is often near. After committing the grossest excesses, which may for a time be attributed to moral depravity, the disorder passes, perhaps suddenly, into unmistakeable mania, and seclusion becomes necessary.

In association with this subject, we cannot avoid allusion to masturbation. I must express my opinion that this subject has been invested with an atmosphere of gloom and terror very much darker than cool observation warrants. The history of the countless celibates of both sexes will carry a just conviction to the reflective mind. But, making all due allowance, the fact remains that the practice is, in some instances, the result or the cause of the most deplorable nervous disorders. Experience has shown that the attendant disorder is not necessarily dependent upon the condition of the external genital organs. The vice has been practised when the clitoris was small; it has been continued even after the clitoris has been amputated. It is kept up in some cases, as is the scratching of pruritus, by local inflammation. I have seen the vulva intensely red, the epithelium abraded, even ulcerated. In extreme cases of erotic mania, and even in cases less severe, I believe—the enthusiastic advocates of non-restraint notwithstanding,—that resort to the camisole is dictated by the soundest medical and ethical laws.

A remarkable fact amongst the phenomena of menstruation is the effect on *pigmentation.* The complexion is commonly changed; it loses its clearness, becomes dull or sallow, and a dark, even black ring, especially marked in brunettes, is traced around the eyes. This is often so conspicuous as to reveal to the initiated what is going on. It is similar to the state of pigmentation wrought by pregnancy, and thus affords evidence of the analogy or relation between the two states. Dr. Laycock says excessive pigmentation is brought about by imperfect oxidation of the carbon; that by imperfect elimination of the carbon, in deficient menstruation, diseases of the liver and kidneys are induced; and that these conditions are promoted by the excessive production of carbon from the use of highly carbonized food. But it is certain that the nervous action is intimately concerned. Thus, in a case figured in the *Obstetrical Transactions,* Vol. XVII., there is in each nipple-areola a part where pigmentation is absent, the rest of the areola being intensely pigmented. We cannot conceive that the blood distributed to the pale portion of the areola was different in quality from that which fed the dark portion. We are driven to conclude that the difference was due to nerve-distribution.

CHAPTER VII.

DISORDERED MENSTRUATION (PARAMENIA, W. FARR).—AMENORRHŒA, CHLORO-ANÆMIA, PRIMITIVE, SECONDARY; ARRESTED OR SUPPRESSED MENSTRUATION; RETENTION OF MENSES OR OCCULT MENSTRUATION; ATRESIA VULVÆ, VAGINÆ, UTERI.

THE *departures from the ordinary character of healthy menstruation* are conveniently classified under *amenorrhœa,* including deficiency of the flow; *menorrhagia,* indicating excess; and *dysmenorrhœa,* indicating that the function is performed with difficulty and pain. These terms, like so many others we are obliged to use in medicine, do not represent any definite disease. Under each of them the most widely differing pathological conditions, mechanical and systemic, are grouped. Many different pathological conditions may alike lead to one symptom that shall be more prominent than the rest. That symptom is the first thing that fixes attention, and for which the patient seeks advice. It is the business of the physician to analyze the patient's condition, and to discover, if he can, what are the associated phenomena, and what is the cause of the leading symptom. This is the method we are daily forced to adopt at the bedside. We will, then, take the symptom, *amenorrhœa,* search out the conditions upon which it depends, and study the various forms it presents.

Some authors associate with primitive absence of menstruation those cases in which the menses are retained by closure of the genital canal. Logically and pathologically, it is obviously more rational to consider these cases apart. They will be discussed under "Retention" and "Atresia." The amenorrhœa here is not real. There is *secretion,* but *excretion* is mechanically hindered; *menstruation is occult.* The most rational division of *amenorrhœa* is into—1. *Primitive,* that is, the flow has never taken place; 2. *Accidental, or secondary,* that is, the function has at some time been established, but has been suppressed.

Primitive Amenorrhœa.—The appearance of menstruation may be retarded for one or two years beyond the usual age without any obvious derangement of health. But in a large number of cases, concurrently with non-menstruation, a remarkable condition of the general system is observed, to which the name *chloro-anœmia* or *chlorosis,* vulgò, *green-sickness,* is given. A marked feature of this condition is a great diminution of the red corpuscles of the blood, and a consequent excessive proportion of water. A thin, pale blood, incapable of carrying on efficiently the functions of nutrition, respiration, or circulation, flows languidly in the vessels. Every organ, every tissue feels the want of adequate nourishment and stimulus. The skin and mucous membranes present a peculiar pallor tinged with green. The lips, gums, and tongue look white. The patient is unwilling to make any exertion, and even the most moderate effort is followed by mental and physical prostration, or an outburst of hysteria. She is listless, indolent, drowsy. The taste and appetite are often depraved. The ordinary diet, as meat or fish, is rejected with loathing. The craving is usually for fruit, cucumbers, pickles, vinegar, or things in which sourness predominates. It is more than probable that the craving for these things is the cry of Nature for a supply of elements which the degraded blood is in need of; it should not, therefore, be too absolutely thwarted. In some cases earthy and alkaline substances chiefly excite the morbid appetite. The heart, ill-nourished, acts feebly; it endeavours by increased frequency of beat to make up for the deficiency in quality of the blood it sends into the general system. It is easily excited to hurried action, which assumes the well-known character of palpitation, and which may on pushing exertion, such as ascending stairs or hills, too far, readily lead to fainting. Excessive irritability of the heart under emotion or physical exertion is the characteristic condition. Severe pain, more or less fixed under the heart, is commonly complained of. Headache is very common, and is easily induced by exertion or emotion.

The watery state of the blood, the general laxity of all the tissues, including the walls of the capillaries, and the feeble power of the heart, lead to local stagnations and to effusions of serum into the cellular tissue of depending parts. The feet especially swell, are cold, readily affected by chilblains. The hands also swell; and this would be frequently observed, were it not that they are subject to constant changes from the hanging position. The face gets puffy, bloated, especially so the loose tissue of the eyelids. The muscular system is flabby and feeble, incapable of bearing any strain; and pains in the muscles are easily induced by even moderate exertion.

Depending upon a similar systemic condition we occasionally see those nodules of limited hyperæmia, ecchymosis, and hyperplasia, which are known as *erythema nodosum.* These chiefly appear in the legs, but sometimes also in the arms. They indicate the extreme debility of the walls of the vessels, and of the surrounding tissues, which in their healthy state contribute so much to the support of the vessels; and may possibly be a form of vicarious menstruation.

The normal flow of blood is not uncommonly replaced by a periodical watery discharge. This must be regarded as menstruation. The vascular system yields under the ovarian stimulus the best substitute for healthy blood which it can afford. This may be called "*imperfect menstruation.*" In these and other cases it is not uncommon to note a persistent leucorrhœa. This form of leucorrhœa is one of those which are not the result of physical lesion justifying local examination. The discharge seems due to relaxation or want of tone in the vessels and mucous membrane. It commonly ceases when healthy menstruation is restored.

In every case in which the deficiency of red globules is marked, a blowing sound, recognized as the anæmic *bruit,* is heard at the base of the heart, and extending along the arterial trunks of the neck. Where this deficiency is extreme there is commonly heard in the vessels of the neck that peculiar and characteristic noise known as the "*bruit-de-diable,*" or the German "*Nonnengeräusch.*"

This sound gives not only precise diagnostic indication of the malady, but its intensity affords accurate estimate of its progress. In proportion as the quality of the blood improves under treatment the noise diminishes. It appears to be directly associated with the relative absence of the red globules. When these are present in due proportion the sound is no longer heard. I have observed this sound in a marked degree in anæmia associated with menorrhagia; and notably in some cases where there was suspicion of commencing tuberculosis.

In some of these cases of associated chloro-anæmia and amenorrhœa it is not easy to determine which is the primary factor. Is the want of menstruation the cause of the degraded condition of the blood? Or, on the other hand, is the degraded condition of the blood the cause of the amenorrhœa? If we could tell which condition came into existence first, and which followed, the sequence, if constant, would settle the question. But the ovary is beyond direct observation; we are almost limited in our conclusions as to its activity by noting the subordinate phenomena of menstruation.

One fact comes out prominently: the state of chloro-anæmia stands in constant relation to the menstrual function. It seems probable that at the age of puberty, ovulation which ushers in such a striking revolution in the economy, stimulating, almost visibly, development of the whole system, and remarkably of certain organs, takes at least an indirect part in the function of blood-making. Or to put it in another way: that evolution of the system at puberty, that almost sudden bursting into womanhood, cannot be perfectly accomplished, unless the ovaries give the impetus. This is illustrated by the occurrence of relapses. For example, a girl who has quite recovered from one attack of chloro-anæmia, may again fall into exactly the same condition, amenorrhœa attending.

Chlorosis, says Virchow, is distinguished from leukæmia in this: the entire number of the corpuscles is smaller. In leukæmia, colourless corpuscles in some sort take the place of the red ones, and a real diminution in the number of the cellular elements in the blood is not produced. In chlorosis the elements of both kinds become less numerous, without the occurrence of any disturbance in the numerical relation between the coloured and colourless corpuscles. Anatomical observations, he goes on to say, indicate that the foundations of the chlorotic ailment are very early laid; for the aorta and the larger arteries are usually, and the heart and sexual organs frequently, found imperfectly developed.

To originate a new function, to bring to perfection a hitherto unexercised power, makes larger demands on the strength than are required for its continued activity. The feeble phthisical child fails, as the time of womanhood approaches, to menstruate, and the signs of chlorosis gradually manifest themselves.

Numerous instances, however, are observed in which after menstruation has been fairly established for months or even years, chloro-anæmia almost suddenly makes its appearance, and entails suppression of menstruation, partial or complete. In many of these cases emotion plays an important part. Jealousy, disappointment in love, the "spretæ injuria formæ" are often the immediate antecedents. No one who has had a large experience can fail to remember numerous examples of the powerful influence of emotion in altering the quality of the blood.

At the advent of puberty, organs hitherto existing only in a latent or potential condition, almost suddenly come into the foreground, and a new function that dominates the whole system appears, or ought to appear. The perfection of the ovaries entails the evolution of the breasts and uterus, and provokes a rapid development of the whole frame. To a certain extent this general physical development will take place, whether ovulation be perfectly performed or not. But, to carry out the full change in the ovaries, a fair supply of healthy blood is requisite. If the sudden excessive demand for healthy blood requisite for this purpose, and for the attendant general physical growth, be not adequately met, menstruation will be hindered. And the continuing, although impeded, general growth, exhausting the blood supply, quickly induces the marked blood-degeneration which is so characteristic. Things once at this stage, a vicious circle of morbid action and reaction is established.

On the other hand, it is observed that when the quality of the blood has been improved under suitable treatment, menstruation usually returns; and that when a degraded condition of blood is induced by defective nutrition, or subjection to bad sanitary conditions, menstruation is suppressed.

The influence of the ovaries is at times strikingly manifested, as when, under the influence of marriage, ovulation being stimulated, the chloro-anæmia often disappears.

We may, perhaps, best sum up the argument by stating these propositions: 1. That the due action of the ovaries gives an important stimulus to innervation, sanguification, and the general well-being. 2. That the due action of the ovaries, as of other organs, depends upon their being properly nourished by a supply of healthy blood. 3. We cannot always tell which factor is first in default.

It has been happily said that amenorrhœa is a cry of distress indicating something wrong in the organism.

The opposite condition of plethora will sometimes delay menstruation. Girls suddenly exchanging a poor vegetable diet for one rich in nitrogen, whilst neglecting exercise, are apt to fall into this state.

A very frequent complaint attending amenorrhœa is acute pain under the left breast, in the intercostal spaces, in the sacral region, or in the temples. These pains have often been described as "hysterical;" and the "hysterical knee" of Sir Benjamin Brodie might perhaps be classed under the same head. It is rather a form of neuralgia, induced by the waste of nervous force in wrong directions.

There are *local causes* of primitive amenorrhœa. The most free from doubt are absence, defective development, or disease of the ovaries and uterus. It is not easy to discover defective development of the ovaries; it can at best be inferred from the existence of defective development of the uterus, and the defect of the menstrual functions. But this is far from being constant. A small infantine uterus may be recognized by the touch, and measured by the sound. The uterus is sometimes only an inch and a half or two inches long, the cervix or vaginal-portion is very small, the os uteri a small round aperture, and the body may be deflected to one or other side. In these cases there is commonly sexual indifference.

Cystic and malignant diseases of the ovaries are rare at the age of puberty. And in a considerable proportion of those cases which occur at a later period, a portion of the gland, adequate to form ova which run through the normal phases, and escape, evoking the attendant phenomena of menstruation, may for a long time resist the invasion of the disease. This residuum of efficient ovary may easily be overlooked; its possible existence must be borne in mind when we meet with cases in which menstruation has continued concurrently with even extensive ovarian disease.

But it must not be concluded that absence, or imperfect development of the uterus, is a certain exponent of absence, or imperfect development of the ovaries. For proof that the ovaries may be well developed and perform their function, although the uterus may be wanting, I refer to a case observed at St. George's Hospital, and cited at page 197.

When the chloro-anæmia has lasted some little time, a slow chronic feverish state sets in.

The *treatment* of this form of amenorrhœa should be governed partly, at least, by the knowledge of the influence of ovulation. But here, as in almost every case which the physician is called upon to treat, we must treat the symptoms, alleviate the consequences of the disease, as well as attack the cause. The two indications can generally be followed out at the same time. Our first effort, then, should be to improve the condition of the blood, since we can hardly expect the ovaries to assume their function energetically until they are properly nourished.

It is accepted as an axiom in medicine that, the blood being deficient in red globules, iron is the remedy *par excellence.* This is true; but it requires more judgment in administering it than is often shown. Long clinical experience has taught me the general law, that in all states of blood-degradation, whether resulting from mal-nutrition, from wasting diseases, or from hæmorrhages, iron is ill tolerated at the beginning. In all extreme anæmic states the febrile irritability I have adverted to is liable to be aggravated by iron, if rudely and precipitately "thrown in," as the phrase is. The tongue gets parched and brown, indicating a like state throughout the alimentary canal, inducing constipation, and generally impeding nutrition; violent headache ensues; the pulse rises in frequency. The true indication is, first, to allay vascular irritability, so as to prepare the system to assimilate iron. This is best done by salines, of which I believe the best is the fresh prepared acetate of ammonia, the old *spiritus Mindereri.* If freshly made it is not only more grateful from containing a quantity of carbonic acid, but it is more efficacious. A little nitrate of potash may sometimes be usefully added; and in almost every case the combination of some light tonic, as hop, cinchona, or calumba, will be of service. Ten drops of the tincture of veratrum, and four or five grains of free carbonate of ammonia, often add to the efficacy of the saline. Digitalis is often useful in allaying irritability of the heart. So marked is the benefit often arising from this exhibition of salines, that one cannot resist the conclusion that the *blood is in want of salines* as well as of iron, and that the saline material is the first want. This view is confirmed by what is observed in transfusion. In extreme anæmia revival has followed the injection of saline fluids into the veins.

When vascular irritability is subdued, when the secreting organs have been brought to a cleaner and healthier state by salines and aperients, iron may be cautiously tried. Nothing surpasses, probably, Griffith's mixture. This also should be freshly made. There is a special virtue in nascent combinations. But it is very nauseous; and modern chemistry has supplied us with other excellent preparations of iron. The citrate of iron and ammonia, which may be given in an effervescent state, if desired, is an excellent medicine; it is generally easily borne. I have long given with great advantage the solution of acetate of iron, or the liquor ferri dialysatus of Squire. These seem easily assimilable, and are, perhaps, the most agreeable of all ferruginous preparations. It is not desirable to give large doses. Iron should rather be regarded as an element of food than as a medicine. The blood wants it; but it must be taken in such a way that the system have time to deal with it like other food-elements, to assimilate it, and convert it into blood. Iron must therefore be given for a considerable time; that is, until the return of colour to the cheeks and mucous membranes, the vanishing of the *bruit-de-diable* and the anæmic souffle, and the establishment of menstruation announce that the system has regained the independent power of carrying on the function of blood-making.

Coindet and Boinet extol the virtue of iodine in amenorrhœa. Trousseau also advises it, saying, however, that it comes in most usefully after iron. Ever since I followed the clinique of this admirable physician I have prescribed iodide of potassium in these cases. But my observation, whilst confirming most distinctly Trousseau's opinion of its efficacy, has led me to prefer giving it before proceeding to the administration of iron. It seems to me to occupy an intermediate place between ordinary salines, which should be given first, and chalybeates. Iodide of potassium may be given in five-grain doses, with or without ammonia and bark, two or three times a day. Bromine is especially valuable as a sedative of the nervous and vascular excitement.

An old popular remedy is saffron. Trousseau extols it. I have tried it extensively, but generally in combination with iodide of potassium, so that I am unable to speak positively of its independent virtues.

The restorative power of iron is often much increased by the addition of small doses of strychnine or ergot. Under these agents the nervous system especially acquires more tone. Sometimes arsenic is of great service. Apiol has been much extolled* in doses of fifty centigrammes, daily choosing the natural nisus as the time. "It is," says Dr. Joret, "the stimulant and the moderator of the menstrual function."

The digestive organs display the same sluggishness which oppresses every function. Constipation is frequent, and the peristaltic action of the bowels requires stimulation. Purgatives are generally necessary, and the favourite ones are aloes or rhubarb combined with myrrh or other stimulating adjuvant. Hoffman said he had seen better results from Rufus' pill—the "pilula de tribus"—consisting of myrrh, aloes, and saffron, given in repeated small doses, than from any other medicine. The concurrence of experience as to the efficacy of this pill should rescue it from neglect.

Concurrently with the use of these medicaments, diet and exercise must be carefully studied. The diet should be generous. Milk is especially useful; but a fair proportion of roast meat, fish, vegetables, and fruit should be taken. Wine, of which claret, Carlowitz, and Rhine wines are the best suited, or beer, should be prescribed in moderate amount.

Exercise, mental and physical, must be graduated to the strength and power of endurance of the patient. In the profound impairment of nutrition which affects every organ, the nervous centres cannot supply the requisite nerve-force, nor are the weak, pale, flabby muscles capable of strong or sustained exertion. Every tissue has to be regenerated. This is a work of time, and during this period care must be taken to make exercise keep pace with, but not exceed, the growing strength.

The aim being to create or to restore the "habit" of periodical menstruation, special care is indicated to favour any molimen that may reveal itself by pain, sense of heat or weight in the pelvic organs, or by nervous or vascular phenomena elsewhere. Perhaps the most precise indication might be obtained from sphygmographic observations. Warm hip-baths—adding enough mustard to act as a slight rubefacient—warm vaginal douche of plain water, or even with the addition of sufficient free ammonia to communicate a soapy feel to the water may be tried. One or two leeches applied to the anus or inside the thighs have often started the natural uterine secretion. These means act by derivation to the pelvic organs.

As further means of following up this indication Schoenbein and Scanzoni recommend aloetic enemata. Golding Bird and Duchenne advised electricity. This agent has been extensively tried; but I am not aware that it has fulfilled the expectations that were at one time built upon it.

Direct excitation of the uterus has been resorted to. Light application of nitrate of silver to the cervix uteri has undoubtedly been successful. More successful still is the injection of a few drops of liquid ammonia into the uterus. The catheterization of the uterus has been said to be serviceable. The wearing of an ivory or metal stem in the uterus has also been advised. The most effectual local remedy is probably the galvanic pessary. But there are obvious objections to having recourse to these topical proceedings in single girls, and the cases are not many in which less objectionable means are not effectual.

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* Dr. Joret, "Bulletin général de Thérapeutique," 1860.

Probably these direct local excitants or derivants are the only true "emmenagogues." According to the old idea, an emmenagogue is a medicine possessing the property of causing the menses to flow, that is, of inducing a discharge of blood from the uterus. It is not clear that any known medicine possesses this property in a direct or immediate manner. But if we adopt the modern theory that menstruation is a function consisting essentially and primarily in the ripening and discharge of an ovum from the ovary, and secondarily of a discharge of blood from the tubo-uterine mucous membrane, we shall see still further reason to doubt the reality of emmenagogues. It is difficult to imagine how any agent we know of can in any direct or immediate way determine ovulation.

Iron, which enjoys the greatest popular reputation as an emmenagogue, undoubtedly acts by first gradually restoring the quality of the blood, and improving general nutrition. If it occasionally acts promptly, it may be supposed that large doses of iron may produce temporary congestion in the pelvic organs. But I have known the experiment to be repeatedly tried and fail.

So in the amenorrhœa of phthisis, menstruation may sometimes return when, under cod-liver oil, iron, quinine, and suitable hygienic means, the disease is arrested, and a comparatively healthy hæmatosis has been gained. But no one would call cod-liver oil an emmenagogue.

It is interesting to observe that those agents which appear to exert a special influence upon the uterus are precisely those which have the property of checking hæmorrhage from that organ; indeed, the bleeding is checked through that very property of causing contraction of the muscular wall. Thus ergot, which possesses the most undoubted power to originate uterine contraction, possesses also the power of checking hæmorrhage. It has no obvious action as an emmenagogue. The same observation applies, although in a less degree, to quinine, strychnine, and digitalis. Mr. Cockburn, an eminent surgeon practising in India, tells me that in that country quinine is very apt to cause abortion in women of delicate fibre. Fordyce Barker has given satisfactory evidence of its power as an oxytocic. Patients have told me that a single dose of quinine has stopped the menstrual flow almost immediately. Quinine no doubt acts with greater intensity on subjects whose nerve and muscle irritability is exalted by tropical heat.

Indian hemp again is credited, I believe justly, with oxytocic properties; but its action in checking uterine hæmorrhage is even more certain.

To this rule galvanism may appear to be an exception. The powers of galvanism as an oxytocic, and even in originating uterine contraction, Dr. Radford and I proved some years ago. And it is regarded by some as the only direct emmenagogue.

Leroux* relates a case in which compression of the femoral arteries was tried in order to restore menstruation. Hamilton of Edinburgh, in a case of suspended menstruation, applied compresses on the femorals by tourniquet. In twenty minutes the pulse became more frequent; in thirty minutes the patient felt a sense of weight and fulness in the region of the uterus, and in an hour and a half the menses set in.

Many of the factors which account for primitive amenorrhœa will also induce *secondary or accidental amenorrhœa.* Thus, defective nutrition, unhealthy occupations in crowded, ill-ventilated rooms, blood-tainting from exposure to sewage-emanations, want of exercise in the open air, which implies privation of the wholesome influences of the sun, will all impede the advent of menstruation. Girls verging on puberty, sent to boarding school or into business in large town establishments, commonly fail to menstruate, whilst the function often is accomplished on their return to free life in the country. In these cases the blame cannot always be assigned to insufficient food, for girls working in trades in cities often get a more substantial diet than they were previously used to. What is wanting is out-door exercise, and less rigorous strain upon the mind and body.

Cretinism exerts a remarkable influence. Lunier (*Nouveau Dict. de Méd. et de Chir. Pratiques,* 1869) says "that puberty is almost always held back, or is only developed at the age of nineteen or twenty in girls, and later even in men. The cretin remains until puberty what he was in the first childhood, and very often there is nothing to distinguish the boy from the girl."

Dr. Langdon Down tells me "that he is able to say with much certainty that idiocy retards by quite two years the first appearance of the menses. In a large number of cases it is much longer postponed, and sometimes never appears. Necroscopic inspection of idiots reveals, as a rule, want of development in the ovaries as to size. Associated with the non-appearance I have observed considerable increase of adipose tissue."

The *causes of arrest of menstruation are numerous.* We exclude, of course, the physiological suspension during pregnancy and lactation. When an organ happens to be in a state of physiological activity, it is specially liable to suffer if the system be exposed to any physical or mental shock. Physiological activity implies hyperæmia; under sudden excitation hyperæmia readily passes the physiological boundary, and the function which was in progress is arrested. Hence, exposure to cold and wet during the menstrual flow will frequently check it. It is said that some women wilfully avail themselves of this deleterious influence, in order to escape from the temporary abandonment of their pleasures which menstruation compels. They encounter a very serious danger. It is not to be expected that the effect will stop short just at the point desired. Ovaritis and pelvic peritonitis are very likely to attend this violent suppression, and permanent, even fatal, mischief has resulted. Dr. Whitehead relates a case in which menstruation was suppressed by cold, which ended in fatal peritonitis. There was no effusion of blood. In another case the same physician found all the large sinuses of the brain distended to their utmost limit, gorged with black, firmly-coagulated blood; no extravasation. Menstruation had been suddenly suppressed by intense mental emotion. On the other hand, it must not be concluded that decided organic change in the ovaries necessarily attends the sudden suppression of menstruation. Aran made minute examinations upon this point. His results were mostly negative. The absence of any serious organic lesion is further proved, in many cases, by the return of the menstrual function at no distant date. The arrest of the flow must therefore be regarded, in some cases, as a reflex phenomenon, the peripheral or centric irritation which caused the suppression causing a diversion of nerve-force and of blood in other directions. It is analogous to the suppression of epistaxis under the application of a cold body to the skin. I have lately seen a remarkably well-developed young woman who never menstruated regularly after receiving a blow on the side.

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* "Observations sur les pertes de sang des femmes en couches," 1810.

Abrupt suppression is, however, often marked by signs of local distress. Pain, a sense of fulness in the pelvis and groins are felt. If examination be made by touch, the uterus is found to be tender, and some tumefaction of the ovaries may be detected. The vaginal-portion is injected. Constitutional disturbance also reveals the local trouble. The pulse rises.

Uterine and ovarian disease not seldom entails amenorrhœa. Inflammation may suspend it, but advancing degeneration of the ovaries is more likely to lead to complete suppression. That menstruation so often goes on notwithstanding the development of enormous ovarian tumours, is explained by the fact that commonly one ovary is healthy, or that where both are affected, yet some portion of one or both retains so much of its normal structure that the process of ovulation goes on, whilst the "habit" is so strong that even slight ovarian nisus provokes the customary flow from the mucous tract.

Emotion, sudden, or that attending a great change in the mode of life, will often suspend menstruation. Thus it is not uncommon to observe in young women absence of the menses for two or three months after marriage, giving rise to the idea that pregnancy has begun. This is often nothing more than an emotional suspension. So, under the greater emotion of illicit connection, the same thing occurs. Passion, depressing news, domestic calamities, have often caused so great a shock that the menses have been arrested even permanently.

Amenorrhœa frequently follows acute diseases, especially fevers. Thus I have seen girls who had exhibited all the characters of healthy development cease to menstruate for months after recovery from scarlatina or typhoid fever. I have known examples of amenorrhœa dating from simply nursing a scarlatinal patient. Exposure to the poison was sufficient, without the development of the fever. In some, the functions are for a long time irregular, imperfectly performed, and the constitution is manifestly impaired. In particular, the complexion seldom regains its original clearness, growth is checked, and the temper is more uncertain and irregular. Ague may have a similar effect.

In some cases of arrested menstruation I have suspected the existence of disease of the supra-renal capsules. In these the arrest came on at ages between thirty and forty; the complexion underwent the most marked dirty sallow change, freckles and spots becoming almost black; there was great mental depression occurring in fits, and great emaciation.

Associated with amenorrhœa, probably as cause, there may sometimes be found a general torpor or deficient innervation of the sexual system. This probably implies defective evolution of the ovaries. There is an original or acquired insensibility. There is no sexual feeling. This has sometimes been observed to follow a labour: but in many cases it is original, and is attended by sterility. Attendant upon this ovarian defect, there is commonly imperfect development of the uterus. In amenorrhœa following labour, the suppressed ovarian function is accompanied by super-involution of the uterus.

Diagnosis.—In studying this question we must bear in mind all the conditions associated with amenorrhœa; we must review the history of the patient, and of her present illness. To trace the circumstances under which the absence of menstruation commenced, we must interrogate all the functions, in order to detect disease in organs unconnected with the genital system. The exploration of the chest is especially important, on account of the frequent relation between amenorrhœa and phthisis.

And in many cases it is necessary to examine the vagina and uterus to ascertain if there be any physical defect or obstruction to the excretion. This applies to married as well as to single women. The possibility of pregnancy must not be lost sight of. The signs of "Retention" will be discussed hereafter.

Prophylaxy.—Many of the causes of amenorrhœa are avoidable. Nevertheless great carelessness, even recklessness, is shown in encountering them. It ought to be needless to insist upon the observance of repose, physiological and physical, at the menstrual periods, the avoidance of exposure to cold or mental disturbance. Adults may be expected to take care of themselves; but young girls verging upon puberty require the watchful care of a mother. Serious mischief often arises from their being taken by surprise at the first appearances. Not being forewarned, in their alarm they may seek to check the bleeding by bathing in cold water, and they are apt to commit other imprudent acts which may suppress the natural flow, and lay the foundation for serious protracted or permanent disease. Many girls, for example, have never menstruated again.

They should be warned then to dress warmly, to avoid excitement, and to keep quiet when the period is approaching and during the flow.

The course, duration, and consequences of amenorrhœa vary. Where there is no organic disease, as tuberculosis, and the subject is submitted to proper hygienic and medical treatment, the function is generally restored in a few months. But in those cases where amenorrhœa is complicated with, or dependent upon, disease in the heart, lungs, liver, kidneys, or ovaries, we can look with no confidence to the end of the symptomatic or consecutive disorder. On the other hand, where the defective action of the ovary appears to be inherent, or primary, its long continuance often entails such impairment of nutrition and innervation as to give rise to distant organic disease. Where there exists hereditary morbid diathesis, especially tubercular, the evil which might otherwise have remained latent is very likely to be developed.

The influence of protracted amenorrhœa upon the nervous system is almost always prejudicial, and is sometimes deplorable. The leading characteristic is want of power or tone. The general physical condition is lowered; the patient is unequal to more than moderate muscular exertion; the fits of irritable temper alternate with torpor; headache is frequent; it is difficult or impossible to sustain any mental effort; memory is feeble; and in some instances mania or dementia has ensued.

Treatment.—The hygienic care is of great importance. Careful watch must be kept for the invasion of phthisis. Hence it is often useful in amenorrhœa, whether there exist any special cause for apprehending the invasion of tubercular mischief or not, to winter in a mild, pure air, as in Torquay, Bournemouth, Ventnor, or the South of France or Italy.

The treatment of acute amenorrhœa from accidental suppression must be governed greatly by the nature of the cause of suppression. If it be the result of cold, a warm bath, rest in bed, sudorifics, as acetate of ammonia, ipecacuanha, a moderate opiate, or terebinthinate enemata will be useful.

But if there be evidence of pelvic congestion or inflammation, it will be unwise to seek to provoke the menstrual flow by local excitants. If there be much pain, increased on pressure, a quickened pulse with hot skin, some leeches applied to the groins or anus, hot fomentations to the stomach, salines, constitute the best treatment. When the pain has come on very suddenly, and with great severity, there is reason to fear that an effusion of blood has taken place from the turgid Fallopian tubes or ovaries into the peritoneum. This case will be discussed under "Hæmatocele."

Chronic amenorrhœa usually falls practically under the same rules as the primitive amenorrhœa. Iodide of potassium, iron strychnine, suitable hygiene, are our chief resources.

AMENORRHŒA FROM RETENTION: RETAINED MENSES FROM OCCLUSION OR ATRESIA OF THE UTERUS, VAGINA, OR VULVA, OR FROM IMPERFORATE HYMEN—OCCULT MENSTRUATION—HÆMATOMETRA.

The study of those cases in which amenorrhœa is only apparent, in which the secretion is effected, but is retained in the cavities of the uterus or vagina, will, for clinical reasons, be most conveniently undertaken here. In its practical bearings it will be found naturally to take its place between amenorrhœa and dysmenorrhœa.

The history and symptoms of retained menses very much resemble those of dysmenorrhœa. For a considerable time, the negative sign of absence of the ordinary menstrual flow chiefly attracts attention; and the case may be looked upon simply as one of amenorrhœa.

The leading clinical feature is the combination of signs of dysmenorrhœa with amenorrhœa. And since retention commonly induces enlargement of the uterus, and hence of the abdomen, the combination of amenorrhœa and this enlargement leads to the suspicion of pregnancy. When things have arrived at this point, the character of the patient, no less than the physical distress and danger, imperatively point to the necessity of an examination.

The usual history is as follows: A girl having arrived at puberty, does not menstruate. Month after month, perhaps for two or three years or more, pass by, and nothing is seen. But every month, perhaps with occasional intermission, pains in one or other iliac fossa, such as commonly indicate difficult ovulation, are felt; pain in the centre of the pelvis referred to the uterus follows or precedes, often of a forcing or bearing-down character, that is, uterine colic, such as occurs when the organ is struggling to expel something from its cavity; frequently the pain spreads to the abdomen, so that the patient cannot bear to be touched, and suggesting the presence of peritonitis. Flushed face, accelerated pulse, headache, vomiting, pains down the legs, irritation of the bowels and of the bladder commonly attend. After a few days these symptoms subside, seldom entirely; and the patient is left to an interval of comparative ease. But her general health suffers. A degree of irritability of nervous system remains. Not seldom, occasional rigors appear, and these are followed by quickened pulse, increased temperature, nausea, muddy complexion; in short, the usual signs of blood-infection. When irritative, hectic, septicæmic, or pyæmic fever sets in, the case is commonly hastening to a climax; and the physician is soon compelled to search for the source of the disorder.

In other cases, the irritative fever, although existing in a minor degree, is not the immediate cause of chief distress. This is due to the distension of the uterus, or vagina, or both, progressing so as to distend the abdomen. The pain, causing vomiting and prostration, may be so great that the local source cannot be overlooked. The enlarged uterus may press the bladder forwards, and jam it against the symphysis pubis, causing retention of urine. The distress arising from this, and the enlargement of the abdomen, admits of no delay.

In other cases the enlargement of the abdomen is slow, and the pain is tolerated. It is only when amenorrhœa and enlargement of the abdomen excite suspicion of pregnancy that advice is sought. In some of these cases the history of the enlargement, extending over a longer period than the normal time of gestation, and other circumstances, are enough to remove all doubt of her chastity from the minds of all but the censorious.

The governing fact, then, is retention of the menstrual fluid in the uterus or vagina. Menstruation is non-apparent, but it exists. The proper term, then, is not amenorrhœa, or amenorrhœa from retention, which is a contradiction in terms, but "occult, or concealed menstruation." The ovaries act, the uterus responds, the menstrual blood is secreted, but owing to some physical obstruction it cannot be excreted, that is, it is retained. These cases may be divided into two kinds: 1. There is retention *ab initio;* there is some congenital defect, or some condition acquired in childhood; 2. The retention has arisen after puberty, and most frequently after child-bearing, and is the consequence of an obstruction acquired after maturity.

We have, then, to examine the cases of *Atresia of the Vulva, Vagina, and Uterus,* and the *other defects of formation* which lead to retention of menstrual secretion.

Atresia (*α* priv. *τρῆσις,* perforation) of the genital canal may be congenital or acquired, primitive or secondary. The congenital conditions consist in abnormal formation from imperfect or defective or excessive development.

Atresia or occlusion may be *complete* or *incomplete,* the degrees of incomplete atresia, of course, varying greatly. The incomplete occlusions, differing somewhat in their pathological and clinical history, will be discussed in succeeding chapters under other heads, as "Dysmenorrhœa," &c. In this place I propose to describe the history of occlusion, complete, or nearly complete.

Atresia may affect any part of the genital tract from the vulva to the uterus, and even the Fallopian tubes. It will be convenient to begin with the description of occlusion of the vulva, and to ascend from this point.

Puech distinguishes three kinds of closure of the *Vulva:* 1. *Adhesion of the labia majora,* always of accidental origin, the result of inflammation or injury; 2. *Adhesion of the labia minora,* also the result of accident, and, like the first, chiefly distressing from impediment to micturition; 3. *Hymeneal atresia,* the most common, and usually spoken of as imperforate hymen, generally congenital. It may come under notice before puberty from the collection of mucus in the vagina causing distension, or it may be detected soon after birth. I have several times incised an imperforate hymen in infants.

The closure of the *vagina* may be congenital or accidental. The congenital kinds may be formed by transverse membranous septa, composed of the folds of mucous membrane with some connective tissue or muscular fibres between. In some cases, imperforation of the cervix uteri complicates that of the vagina. The accidental closure of the vagina is far more frequent; it is almost always the consequence of cicatricial contraction after injury or inflammation. The walls cohere; the vagina is more or less perfectly obliterated.

True occlusion or atresia of the *os uteri* is commonly the result of a cicatricial process following upon ulceration, granulation, or laceration. The most frequent cause is laceration or sloughing, arising from severe labour, with or without instrumental aid. It has been caused by burns suffered during childhood; by cauterization of the os uteri with potassa fusa; from cicatrization following inflammation in small-pox, scarlatina, typhoid; from sloughing of the mucous membrane of the vagina, from use of a too concentrated solution of perchloride of iron (Tissier, *Gaz. des Hôp.*, 1869); after amputation of the cervix, for want of sufficient care to maintain the patency of the canal during cicatrization;

also from advancing senile atrophy, which produces a kind of concentric obliteration of the os. Rokitansky describes this last form. I have seen many examples of it. Klob describes a peculiar form of obliteration of the os externum as following upon prolapsus, with inversion of the vagina. A small pit alone shows the seat of the os, and the atresia is caused by a milk-white membrane formed of layers of vaginal-epithelium.

Closure of the *uterus* most frequently takes place at the os internum or os externum. It may be the result of extrinsic causes, as from external pressure of tumours; from flexions of the uterus, more especially from bending of the body forwards or backwards upon the neck, so as to form an acute angle at the seat of flexion; from tumefaction of the mucous membrane, as from catarrhal or other inflammation; from the growth of cancerous or fibroid tumours in the substance of the neck; from plugging by clots, membranous substances, or pseudoplasmata. These conditions may be diagnosed from true atresia, and sometimes may be relieved by passing the uterine sound.

Another form of closure is due to the sealing of the os externum or internum by a false membrane, as described by Naegele. This has been observed to take place during pregnancy, so that at the time of labour no os uteri could be felt.

Absence of uterus, according to Kussmaul, is very rarely complete. Even when exploration is made by finger in rectum and sound in bladder, a rudimentary uterus may evade detection by slipping on one side. Even on dissection, unless very carefully conducted, a rudimentary uterus may escape detection. In one case (Perkins, cited by Howship) the uterus, containing two pounds of blood, was found *behind* the closed vagina.

An apparently absent vagina is no proof of absent uterus. An artificial route has several times been made to the distended uterus. (Amussat.)

In some of these cases of *absent vagina* the os uteri has opened into the rectum or urethra, and these canals being used by the intromittent organ, impregnation has occurred. According to Dr. Oldham, there is in many cases of closure or malformation of the vagina, an original dilatation of the urethra, a circumstance which has embarrassed the examining surgeon. This enlargement of the urethra has been commonly supposed to be the result of accidental or voluntary substitution of the urethra as a copulative organ; but Dr. Oldham is, no doubt, right in recognizing it as pre-existing and independent of this use. Dr. Routh related a case (*Obstetrical Trans.*, 1870) confirmatory of Dr. Oldham's view. It may, however, be due in some cases to surgical examination. Uterhart* relates a case of nearly complete occlusion of the introitus vaginæ by cicatricial degeneration, in which the function of the vagina was performed by the dilated urethra. The defect was cured by operation. The urethra then contracted to its normal state. Karl Rokitansky described (*Medical Record,* 1877) a case in which the urethra served for vagina.

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* Berlin, "Klin. Wochenschrift," 1869.

Spencer Wells (*Med. Times and Gaz.,* 1870) relates cases where the urethra was used for the vagina, although the vagina existed closed by hymen. In one case the vagina was apparently wanting, but menstruation was regularly performed through a small fistula between the urethra and anus. This being incised, an opening was made into a well-formed vagina above, the normal os uteri opening into it.

It is remarkable that retention has frequently been observed where the uterus was two-horned, or double. One uterus is occluded, and becomes the seat of retained menstrual fluid, whilst the other uterus performs its function normally, or is the source of metrorrhagia. Decès (*Bull. de la Soc. Anat.,* 1854) tells a case in which retention in one uterus led to rupture of the horn, and fatal peritonitis. Leroy (*Journ. des Connaiss. Méd.,* 1835) published a case in which there was occlusion of the right uterine neck, retention of menstrual flux, and formation of a tumour reaching to the umbilicus and simulating pregnancy. Rokitansky relates an important case (*Zeitsch. d. Gesellch. d. Aerzte,* 1860). He dissected a woman who died under symptoms of pelvic inflammation. The uterus had a complete septum. The right half only communicated with the vagina, which was single. The left half was shut off from the vagina, and expanded into a pouch containing a dirty ichorous matter. This pouch formed a fluctuating projection into the roof of the vagina. The septum between the two uteri was perforated by ulceration. Rokitansky concluded that there had been imprisonment of menstrual fluid in the blind half of the uterus, causing, first, distension of the cervix, then inflammation and perforation of the septum, with consensual inflammation of the collateral (left) ovary, leading to abscess and peritoneal effusion. Dr. Beronius relates a similar case (*Mon. f. Geburtsk.,* 1862). The distended half of the uterus was punctured; but death ensued from acute peritonitis in thirty-six hours.

G. Simon relates* a case of congenital atresia of the left half of the vagina at the vulva, with duplex uterus. There was retention of menstruation in the closed half, and contemporaneous metrorrhagia from the open half.

In the *senile form of occlusion,* pain of an acute kind ensues whenever there is any secretion forming in the cavity of the uterus. In women in whom the menstrual function has ceased, there sometimes exists a form of catarrhal inflammation of the lining membrane of the uterus, giving rise to a mucous or muco-purulent secretion, which, being retained, produces symptoms resembling those from retained menstrual blood. If the fluid is watery, this is called hydrometra. The uterus seldom attains a size comparable to that observed in cases of retained menses; but the cavity is always somewhat enlarged. On examining by the finger, the uterus is felt enlarged, often retroflected; the os externum is sometimes difficult to make out, from the vaginal-portion of the uterus being atrophied, and so leaving the os flush with the roof of the vagina. Generally, however, the point of the sound will penetrate a little way; and by persevering with gentle pressure, sometimes a passage is gradually found into the uterus.

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* "Monatsschrift für Geburtskunde," 1864.

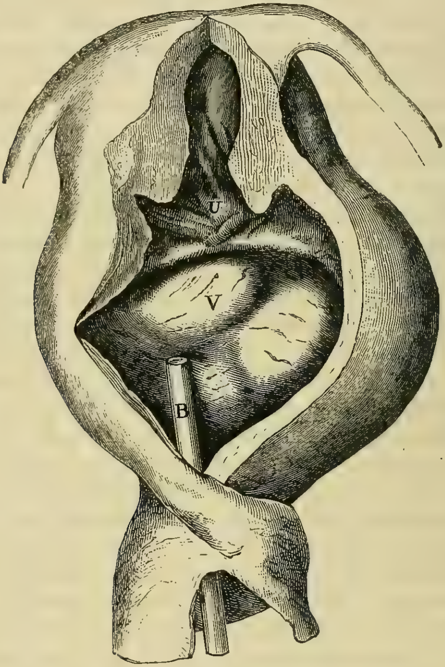

Fig. 62.—(Half-size.)

FROM A PREPARATION IN ST. GEORGE'S MUSEUM.

U, dilated uterus; V, dilated vagina above the seat of atresia, traversed by B, a piece of bougie. The Fallopian tubes are not dilated (R. B.).

There is a feature in the history of stenosis and atresia of the genital canal, which it is interesting to describe, on account of its bearing on treatment. Under the condition of stenosis or atresia long persisting, this canal obeys the same law which rules over other canals or hollow organs. It undergoes retrograde dilatation above the seat of stricture. This is the almost inevitable consequence of the futile attempts of the muscular coat to expel the retained contents. This successive ascending dilatation of vagina, cervix, body of uterus and tubes, is illustrated in Figs. 62 and 63, taken from preparations in St. George's and the Radcliffe Museums. This effect is seen in the most marked form in cases of imperforate hymen. The vagina being the most distensible part of the canal dilates first, forming a large pouch; then the cervix uteri is distended; then the cavity of the body of the uterus; and lastly, the Fallopian tubes. This dilatation, conservative in its effect by accommodating the contents which cannot be evacuated, has its limits. When these are reached, the danger of rupture or perforation at the weakest part is great. But before this comes to pass, there are two events which may happen. The first is transudation of

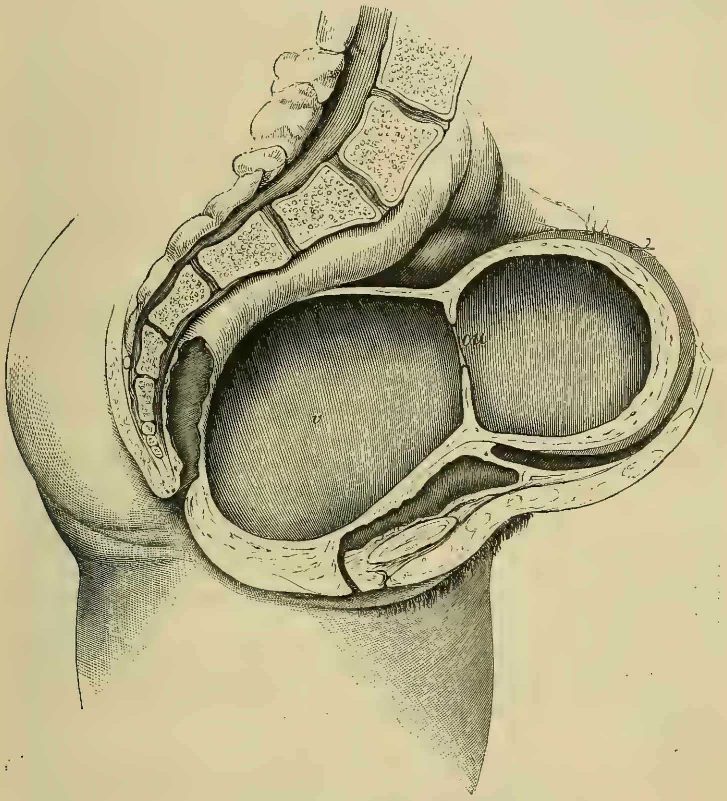

Fig. 63.—(One-third size.)

FROM SPECIMEN IN RADCLIFFE MUSEUM, OXFORD—(CASE DESCRIBED BY DR. TUCKWELL).

v, cavity of vagina distended; *o u*, os uteri, and cavity of uterus above it also distended. Complete occlusion of vulva (R. B.).

the more fluid part of the contents under the concentric compression to which it is subjected. The experiments of Dr. Duncan, to which I have referred (p. 191), show that under a certain degree of hydraulic pressure, air or liquids traverse the entire wall of the uterus. This is the old experiment of the Florentine metal globe applied to organic tissues. His experiments, of course, were performed on dead tissue. But there is good reason to believe that the force which the living uterus exerts in its efforts to expel what may be in it, whether it be a fœtus or imprisoned fluids, is enough to drive fluid through its walls, in the form of a fine oozing or dew, which hangs on the peritoneum. It seems to me probable that it is in this way that some cases of puerperal pelvic peritonitis are produced; and I have seen cases of septicæmia and peritonitis occurring from retention of menstrual fluid, greatly resembling puerperal fever, in which there was no rupture, and no escape of fluid by the open ends of the Fallopian tubes.

Supposing that the structures retain their integrity, it is natural that the concentric compressive force should drive the contents along any passage that may be pervious; hence the escape by preference along the tubes. This is rendered more likely by the dilatation which commonly takes place at their uterine ends.

This compressive force is exerted with most effect immediately after the puncture of the closed hymen. The sudden collapse of the walls of the uterus ensuing upon the partial escape by the opening excites the uterus to contract. This contraction drives the contents in all the three directions, and some will probably escape through one or other of the tubes into the peritoneal cavity.

The more common event is the laceration of the tubes at the weakest place, caused by the sudden dragging upon them by the retreating uterus, the tubes being, perhaps, held back by adhesions.

Other consequences of retention, if not relieved by operation, are: the distension of the uterus leads to perimetritis, with adhesion to the surrounding parts, especially of the Fallopian tubes to the ovaries and broad ligaments. The thinning of the uterus may proceed to bursting. The distended Fallopian tubes may burst, or without bursting, an overflow of blood may escape into the peritoneum, causing peritonitis. (Brodie, Kiwisch.) Béclard relates a case in which the uterus burst, discharging into the bladder. Scanzoni and Arthur Farre relate cases in which the distended hymen burst; in Farre's case death resulted. In other cases (see Puech) the obstructing membrane has given way by ulceration, and a cure has resulted.

The constitution suffers from hectic, the result of pain, and the absorption of the altered blood from the uterus. In some cases

—Lizé relates one (*Union Médicale,* 1863)—the impossibility of evacuating the collecting menstrual blood induces amenorrhœa; the ovaries and uterus give up their functions. Lizé believed that in his case atrophy of the uterus was induced. Dr. Murray, of Newcastle, relates a case (*Brit. Med. Journ.*, 1868), of a single lady, aged twenty-seven, whose vagina was closed by small-pox in infancy. Menstruation had been suspended for fourteen years. The vagina being opened up, no collection was found in the uterus, but exactly a month afterwards menstruation appeared, and recurred with tolerable regularity afterwards. In this case it was clear that the ovaries were not atrophied, but that the uterus ceased to pour out menstrual blood. This is in accordance with what sometimes occurs in apparent amenorrhœa, without uterine obstruction. Ovulation may go on without exciting menstrual flow. This returns when a healthy state of the blood is restored. Simon relates (*Mon. f. Geburtskunde,* 1851) a case of complete closure of the vagina, with a distended uterus. A vain attempt was made to establish a vagina. The patient maintained good health notwithstanding.

The character of the retained blood is remarkable. It is dark-coloured, deficient in fibrin, of treacly consistence, rarely containing coagula; it contains mucus, and often cholesterine scales. It is glutinous, inodorous. The quantity varies with the duration of retention. Occasionally the tolerance and accommodation are surprising; the uterus may be expanded to the size of the end of pregnancy. Ten pounds of blood have been collected; I have collected forty ounces, and this perhaps is an average amount. Puech deduces from comparison of quantity and time of retention that, as a rule, the quantity is less than the number of menstrual periods would have produced normally. Letheby (*Lancet,* 1845) analyzed forty ounces, which gave water, 875·4; albumen, 69·4; globulin, 49·1; hæmatosin, 2·9; salts, 8·0; fat, 5·3; extractive, 6·7. There is another analysis of retained menstrual fluid by H. Müller in Henle and Pfeuffer's *Zeitschrift,* 1846.

Sometimes the fluid undergoes decomposition, and then gas mixed with the blood constitutes *physo-hæmatometra.*

The *symptoms and diagnosis of retention* are those which might be expected from obstructed functions. "Impediuntur coitus, conceptio, et purgatio." Until the advent of puberty, nothing may cause suspicion of abnormality. But with the onset of menstruation distress begins, due to retention of the menstrual fluid; at first, perhaps, this is limited to passing attacks of uterine colic, marked by pelvic pain and bearing down or expulsive efforts. Vomiting often attends, as in all cases where the uterine fibre is suddenly stretched. These attacks, more or less periodical, are not attended by the expected appearance of the menses. Occasionally there is a vicarious discharge of blood in form of epistaxis. In Pallen's case, one of absence of the vagina, there were marked menstrual molimina, but no accumulation of menstrual blood in the uterus or neighbourhood. When an artificial vagina was made, menstruation took place periodically by this channel, and the epistaxis ceased. Gradually the distress increases. A sense of fulness in the pelvis arises; the hypogastrium enlarges; the abdomen is visibly larger; perhaps pregnancy is suspected; there is sometimes retention of urine from the pressure of the uterus and vagina distended with the accumulating menstrual secretions; defæcation is difficult, and the digestive function is disturbed; irritative fever, with a sallow skin, and vomiting—the result of absorption of the watery part of the confined fluid—sets in. A firm, even tumour is felt rising from the pelvis behind the symphysis pubis, sometimes as high as, or even higher than the umbilicus.

The uterus gradually yields under excentric pressure; as in pregnancy, or when it contains a growing polypus, it then grows, its muscular walls as well as its cavity enlarging. This process meets to a certain extent the pressure of the accumulating fluid; but the contained matter receiving fresh increments at every menstrual epoch, after a time requires more space: then other compensating processes bring alleviation, and stave off for a while the critical moment when the strain can no longer be borne. The more watery element of the contained fluid is absorbed. To supplement the imperfect distension of the uterus, another cavity is formed by the distension of the vagina. The tubes stretching, form further supplementary receptacles. The uterine and vaginal cavities are usually divided by a strait formed by the cervix uteri (see Figs. 62, 63).

This vaginal pouch may be very large, especially if the occlusion exists at the vulva, when it may so compress the rectum as to obstruct defæcation (Tuckwell), or cause retention of urine. The obstruction to normal menstruation is sometimes compensated by menstrual deviation, that is by fluxes from the intestines, bladder, nose, skin, &c. If the occlusion exists higher up the vagina, a pouch is still formed. And it is remarkable that the vaginal wall undergoes hypertrophy in the same way as the uterine wall. In a fatal case, Dr. Sutton (*London Hosp. Reports,* 1867) found the vagina so much hypertrophied that the walls at the upper part were quite as thick as the uterine parietes. Klob contends that in cases of obstruction at the vulva, it is the vagina that chiefly, or almost exclusively, forms the sac, the uterus scarcely contributing. This is certainly not always true; and it may be doubted whether it is even generally so. Dr. Tuckwell's case (see Fig. 63) exhibits manifest dilatation of both uterus and vagina; and that this was also the case in two women whom I relieved by operation, I had distinct evidence. The uterus certainly enlarges considerably, and the easily distensible Fallopian tubes become generally distended, forming distinct tumours, readily felt on either side; sometimes, as Bernutz remarks, mistaken for pelvic phlegmons. The Fallopian tubes have been found distended, even when shut off from the uterine cavity; but generally the uterine orifices of the tubes are expanded. A further stage leads to the escape of blood from the Fallopian tubes at their fimbriated extremities, or through rents into the peritoneum. This event, long ago pointed out by Brodie, has been amply confirmed by subsequent observers. The blood collecting in Douglas's pouch constitutes retro-uterine hæmatocele. The common effect of this is pelvic peritonitis, sometimes fatal, at others resulting in segregation of the effused blood by plastic matter; a later stage of which is a process of suppuration or necrosis of the posterior vaginal wall and possibly discharge of the hæmatocele and cure. As Bernutz says, and I venture to add my own testimony in support, the foregoing phenomena of obstructed menstrual flow may result from uterine deviations, especially flexions, from spasmodic contraction of the cervix uteri; and, according to my own observation, from congenital narrowing of the os externum uteri associated with a conical vaginal-portion. The symptoms of abdominal shock and peritonitis following upon those of retention of menses, indicate the occurrence of effusion of blood from the Fallopian tubes into the peritoneum. These symptoms depending on the same accident are very liable to follow operations for the discharge of the retained fluid. The history of hæmatocele will be fully discussed hereafter. A tumour is formed, sometimes of considerable size, in Douglas's sac; at first, this is soft, fluctuating; it then gets harder under coagulation, and the effusion of plastic matter around it; a firm tumour may be felt rising above the pubes, even to the umbilicus. The abdominal walls can be made to glide over it; the limit of the tumour may be defined by percussion; inferiorly the tumour sinks into the pelvis. By the vagina, we find the tumour pushing forward the roof and posterior wall of this canal, shortening it, and compressing it from behind forwards, so that the finger is guided to the os uteri driven forwards behind the symphysis. The os felt in this position, and a firm rounded mass extending behind it, has been mistaken for retroversion of the enlarged womb, and this the more readily, because retention of urine has often been an urgent symptom.

Sometimes the atresia, especially in the acquired cases, as when cicatricial occlusion takes place after fevers, sloughing from severe labour, or from injury by instruments, is not quite complete. There may remain a narrow fistulous track, communicating with the expanded sac which receives the menstrual collection, and which affords an occasional, but rarely complete relief by oozing. Such a fistulous tract may act for a long time as a sort of safety-valve, by which extreme tension is relieved. It is liable to complete occlusion at times. The following case is an instructive illustration.

The subject had been delivered by instruments of twins after a severe labour. From that time she had suffered more or less difficulty in menstruation. This difficulty had increased gradually; and at the end of twelve years her condition had become anxious. At each menstrual epoch severe colic with expulsive pains set in. An enlargement was felt rising considerably above the pubes. Partial relief had been obtained by escape of blood and offensive ichorous matter. At times retention of urine had occurred. The passage of the catheter was difficult, owing to the urethra being compressed by the tumour. Distress increased at the menstrual periods. The vagina was quite occluded by contracted cicatricial tissues, extending from the meatus urinarius to the anus, nothing but a scarred furrow marking the site of the vulva. There was a minute fistulous tract, which had probably given partial relief at times. I dissected up carefully between the urethra and anus, and struck the sac about an inch above the external surface. Offensive ichor, mingled with dirty-white clots, escaped. She made a good recovery.

In the first edition of this work (p. 204) is also related the case of Mrs. W——. Since that publication the case has issued in a catastrophe especially interesting as illustrative of atresia. After recovering from yellow fever in South America she suffered from aggravated dysmenorrhœa, inducing despondency and other nervous symptoms. The vagina was represented by a wide shallow cul-de-sac, not an inch deep. About the middle of this sac was a small round hole, which just admitted the point of the sound. Pursuing this track for two inches, a small solid body was felt by the finger in the rectum, which I concluded to be an imperfectly developed uterus. Whether the atresia was congenital or acquired is uncertain. It might have dated from the yellow fever. The parts were dissected up at two sittings, and a free communication made with the uterus. The new vagina was kept open by a Hodge's pessary. A month after the last operation, the vagina was well preserved, and examining by a Fergusson's speculum during a period, I could see the menstrual fluid being poured into the summit of the vagina. For the first time she was menstruating without pain, and her health and spirits were already improved. She menstruated healthily several times; her health was fairly restored. Then her husband joined her. A few months after this she was seized suddenly with signs of "abdominal shock" and collapse, and died. The cause, as I was informed, was rupture of an ectopic gestation cyst. The uterus was probably two-horned, and the gestation an instance of gestation in the imperfectly-developed horn. The issue, lamentable and beyond prevision, proves, nevertheless, the success of the operation. I have endeavoured to represent the state of the parts before operation in Fig. 64.

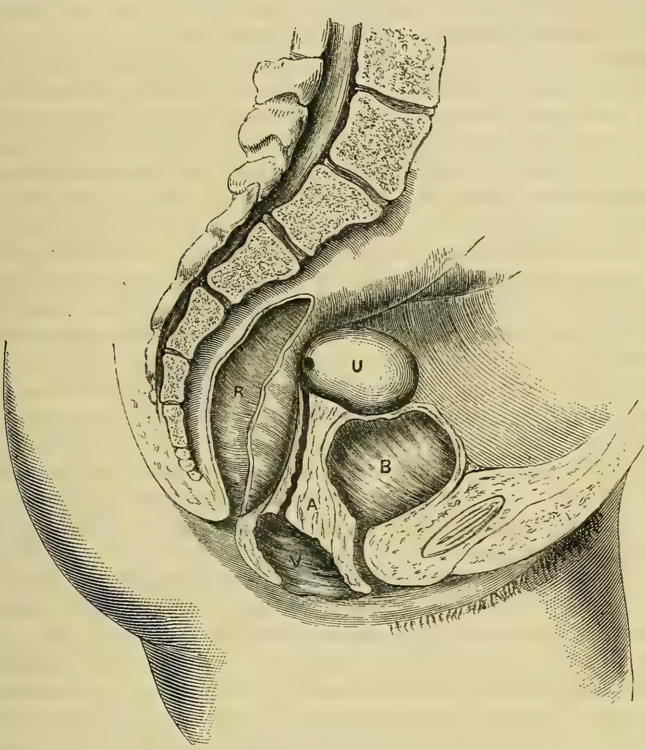

Fig. 64.

ATRESIA OF VAGINA.

R, rectum; B, bladder; U, uterus; V, cul-de-sac at vulva; A, dense tissue in place of vagina traversed by a narrow fistulous tract between V and uterus (R. B.).

Dr. Gardner cites* from Meigs "a case of unusual form of stricture of the vagina, which was the cause of an almost fatal error in diagnosis." The stricture was traversed by an extremely narrow fistula, just permitting of what has been called "stillicidium mensium." Professor Thomas† describes a similar case.

Simpson describes "a kind of adhesive or obliterative vaginitis" in adults, differing in some respects from the adhesive vaginitis of infants. In infants the inflammatory closure is usually limited to the orifice of the vagina, and produces complete occlusion. In adults it generally commences at the upper part of the vagina, spreads gradually downwards, and seldom produces complete occlusion. It is almost always attended with a circumferential contraction of the canal at the site of the disease, so that when it is limited, as it often is to the top of the vagina, the os uteri is felt drawn up to the apex of a narrow conical or funnel-shaped cavity. But it occurs without this circular contraction, says Simpson; and I feel justified by observation in affirming that this funnel-shaped contraction of the upper part of the vagina may occur independently of inflammation. The adhesion is more agglutinative, like that which unites serous surfaces in the early stages of inflammation, than true fusion. The finger can separate the adhering surfaces.

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* Gardner on "Sterility," New York.

† "Diseases of Women," Philadelphia, 1869.

It is a remarkable circumstance in connection with the history of atresia, or absence of the vagina, where no uterus can be found, or at least only such a rudimentary one as to be incapable of performing the functions of a uterus, that the artificial formation of a vagina brings considerable relief. Of this I have seen examples; one especially was that of a well-developed young lady, who had suffered from what may be called difficult ovulation; there was evidence of menstrual molimina, but there was no discharge. I dissected up a canal between the rectum and bladder; a good vagina was maintained by wearing a Hodge's pessary; and she recovered health, remaining free from pain, and married.

This, and other cases (see Dr. Clarke's case, p. 198), and one which I may specify of a young woman at St. Thomas's Hospital, prove that ovarian development may be good, and the uterus remain undeveloped. They prove that the general frame may be well developed, notwithstanding the want of a uterus, and that the evolution of the general frame is due to the ovaries.

Treatment.—In the case of apparent absence of the vagina there are three methods of proceeding. The first is to cut a channel through the tissues between the urethra and the rectum up to the uterus. The second, adopted by Fletcher (*Lancet*, 1830-1831) and Amussat (*Gazette Médicale,* 1835), is to tear or stretch out a canal by the fingers or other dilating instruments. The third may be called the mixed method, making use both of cutting and dilating. The last combines the advantages of the two preceding, and at the same time reduces their disadvantages. Whatever mode is adopted, the patient is placed in lithotomy position, the space between the urethra and rectum is carefully examined, the index of the left hand is passed into the rectum, the sound is passed into the bladder, and feeling for it by the finger in the rectum, the amount of tissues available for burrowing, and the position of the uterine tumour are determined. Then, the sound is held up under the pubic arch, whilst the finger carries the rectum away in the opposite direction. A transverse incision is made in front of the anus through the skin, then cautiously nicking with the knife or scissors and stretching out with the fingers, working, *from side to side*, between the finger in rectum and the sound in urethra as guide, a canal is opened to the uterus. Care should be taken not only to make all incisions laterally, but to work backwards towards the rectum, as the chief danger is that of penetrating the wall of the bladder. If the os is felt, a sound should be tried first; if the os be impervious, it may be perforated by a trocar or by the knife. It may be desirable to carry out the proceeding at different sittings. It will generally be necessary to place a tent or bougie in the uterine opening to prevent closure; and the artificial vagina must be preserved by plugging with lint steeped in carbolic acid oil, glycerine, or what I have found to answer better, a narrow Hodge-pessary. The tendency of the parts to contract and close again after operations for the restoration or formation of a vagina is very great. The operation may have to be repeated, unless great care is taken to preserve patency by artificial means.

Where the closure of the vagina is the result of cicatrices from sloughs, the same cautious mode of dissecting and dilating may be adopted. Where the vaginal canal exists, and there is closure of the vulva by agglutination of the nymphæ, or from imperforate hymen, the preponderance of testimony is in favour of making an opening into the vagina. The distended fluctuating membrane indicates the spot. This is pierced by a trocar, or better by a knife.

Imperforate Hymen.—It has frequently been discussed how the catastrophe of sudden escape of the retained fluid into the peritoneal cavity can best be averted. Is it better to make a very small opening in the hymen and let the fluid drain away gradually, hoping that in this way the suddenness of the collapse of the uterus might be diminished? This is the plan I have hitherto followed. But others have preferred making a free incision at once, and even proceeding to wash out the cavity. I am not sure that this is not the best plan. A free external outlet would make it easier for the contracting uterus to expel its contents by this route, and thus take off the pressure towards the tubes. On the other hand, the rapid retreat of the uterus would favour laceration of the tubes, if held back by adhesion. The balance of advantages and of drawbacks of either plan is difficult to strike; and it is to be apprehended that cases will continue to occur in which a fatal result will follow any method of treatment.

A plan which I should be disposed to try is to draw off a little at a time by the aspirator-trocar, so as to effect a very gradual diminution of the cavity before finally freely dividing the obstruction. In any case absolute rest should be rigidly enforced. On no consideration should even simple puncture of an imperforate hymen be done in the consulting-room. I believe the opening should be sufficiently large to admit of easy evacuation, and that to prevent the entry of air a compress should be applied over the uterus and sustained by moderate pressure with a bandage. In some cases injections of warm water have been used to wash out the uterus. It is doubtful whether this is good practice at the time of the operation, but if there should arise decomposition, the gentle injection of a weak solution of permanganate of potash or carbolic acid will be desirable. After a few days it is proper to enlarge the opening by removing a circular piece of the membrane.

Absolute rest in bed for some days is a wise precaution, notwithstanding the histories of cases where impunity has followed its neglect. Symptoms of peritonitis, indicating that retained fluid has suddenly escaped into the peritoneal cavity, have set in on the third or fourth day. The contraction of the uterus leading to this catastrophe does not take place immediately after the operation. The greatest care therefore is necessary for some days afterwards.

Drs. Ramsbotham and Lefort collected several cases in which simple puncture of imperforate hymen terminated fatally. Simpson relates a case of occlusion of the vagina from adhesion causing a septum of no great thickness. Retention of menstrual fluid was going on, so a very small incision was made; the patient remained well for two or three days, great quantities of the usual dark grumous fluid constantly escaping by the vagina. On the third day surgical fever set in, and in a few days she died. The autopsy showed that the interior of the distended uterus had become the seat of a very intense inflammation, which had spread thence, and led to a severe and fatal peritonitis. This was probably set up by air getting into the uterus and causing decomposition and septicæmia. It strengthens the argument for free incision and washing out the uterus.

In cases of *occlusion of the uterus* with retention of menses, the indication is to make a passage into the cavity. The opening into the uterus is best made by a fine-pointed knife. After piercing in the central point, the natural seat of the os uteri, incisions may be made *on either side*, and by carefully dissecting upwards, a passage is made into the cavity of the uterus. The fluid evacuated, it is necessary to introduce a tent—a metallic one is best—to preserve the opening, which would otherwise close, and lead to a repetition of the mischief. This liability is especially great in cases of contraction after amputation of the neck.

Some have advised puncturing by the rectum in preference, and even puncture of the uterus above the symphysis pubis has been recommended. The experience of puncture of the rectum is not so favourable as to show any superiority over opening by the vagina. It is an imperfect operation, for the establishment of a vaginal canal would still be indicated when relief from hæmatometra has been obtained. In cases where opening up the natural route is impracticable or too hazardous, opening by rectum may be resorted to as a temporary expedient. Fatal peritonitis followed in cases treated in this way by Antoine Dubois and Dupuytren.

Dr. Oldham (*Guy's Reports*, 1857) reports two cases in which puncture per rectum was practised. In one there was congenital absence of vagina; the os uteri was felt through the rectum, the trocar was made to pierce at this point. The operation was repeated on four occasions; at last the opening continued patent, and menstruation took place by the rectum. In the other case the vagina was closed by dense cicatrix; the os uteri was felt by rectum, and was punctured; relief followed. A third case at Guy's is reported by Dr. Hicks (*Medical Times and Gazette*, 1861): here there was absence of vagina; puncture by rectum was followed by relief, and, as far as the report goes, there was subsequent amenorrhœa.

When these cases of retention have been relieved, and have apparently recovered, it must be remembered that the Fallopian tubes do not at once, perhaps not for a long time, recover their normal calibre. Some degree of abnormal dilatation remains. This is certainly the case in the partial retention due to stenosis of the cervix and to retroflexion. The knowledge of this fact is of the highest importance in practice. The long-continued obstruction having entailed dilatation of the uterine cavity, and catarrh of its mucous membrane, with very often a disposition to metrorrhagia, the physician is tempted to inject astringent fluids into the uterus. Fatal accidents have followed this practice, and much discussion has taken place as to the immediate cause of these accidents. The prevailing idea is that the injected fluid is driven along the tubes by the force of the syringe, its return by the cervix being stopped by the injecting tube which fills it. I am disposed to believe that where there is unusual patency of the Fallopian tubes this may occasionally be the case. But the more common mechanism, I am convinced, is that which I have just explained as occurring in retention from imperforate hymen. The astringent fluid thrown into the uterine cavity acts primarily as an irritant and constringent. This action is forcible and rapid. The uterus instantly contracts and pumps on the fluid along the patent Fallopian tubes. That this was what occurred in a case in which a solution of perchloride of iron was injected into the uterus, on account of hæmorrhage from retroflected uterus, in the London Hospital, seems to me beyond doubt. The tubes were found patulous, and fluid had run along them into the peritoneal cavity.

CHAPTER VIII.

DYSMENORRHŒA—NEURALGIC; CONGESTIVE; FROM OBSTRUCTED EXCRETION; INFLAMMATORY; OVARIAN DYSMENORRHŒA; DYSMENORRHŒA MEMBRANACEA, OR EXFOLIATIVA.

DYSMENORRHŒA is the term used to express that menstruation is performed with difficulty and pain. It is a very frequent affection, being symptomatic of, or consequent upon, a variety of morbid conditions. These morbid conditions of course are mostly unknown to the patient; she applies for relief of the functional distress. To give the sought-for relief we must form a clear idea of the causes of the distress. The method by which this knowledge is arrived at is partly by clinical observation and study of the phenomena which present themselves, and of the condition of the organs involved; and partly by observation of the effects of treatment. It may be admitted that the means of treatment employed are sometimes empirical; that is, they are not directed by a clear comprehension of the cause of the distress; but if we find that this is frequently followed by success, empirical though it be at first, it will lead us to a clearer knowledge of the evil which it overcame, and thus it becomes rational.

By this double process we arrive at the conclusion that cases of dysmenorrhœa may be classified under the following heads:—namely, 1. Neuralgic, or sympathetic. 2. Congestive, or inflammatory. 3. Mechanical anomalies of the uterus. 4. Fallopian obstruction. 5. Ovarian disorder, constituting a distinct form of dysmenorrhœa.

The simple study of the subjective phenomena will not enable us to distinguish cases of one kind from those of another kind. Indeed, so long as this very imperfect method was exclusively pursued, all cases of dysmenorrhœa were confounded together, or the distinctions made were necessarily arbitrary and fanciful, and treatment, being aimed at random, was generally unsuccessful. This is a logical necessity. For the practitioner who limits his observation to the subjective symptoms must perforce exclude from his resources those means which are suggested by the objective method of investigation. Not many years ago, dysmenorrhœa was almost universally looked upon and treated as a nervous affection of the uterus itself, or sympathetic with disorders of distant organs, or the expression of constitutional debility. But in proportion as precise objective methods of investigation have been applied to the study, it has been discovered that in most cases the nervous phenomena are dependent upon distinct abnormal conditions of the uterus or of the ovary.

If, therefore, we still retain the term *neuralgic dysmenorrhœa*, we must do so on the understanding that, although expressing a really existing disorder, it is a convenient *asylum ignorantiæ*, under which we may class a number of cases, the true pathology of which eludes our research. We have already adverted to the "*irritable uterus.*" The late Dr. Robert Ferguson, commenting on Gooch's description,* said: "This malady, I believe, is deeply rooted in the very essence of that complex organic function termed the generative; which, in its most comprehensive sense, includes no inconsiderable portion of the moral as well as of the physical development of the female organization." . . . . The local changes have been the fluctuating, the nervous affection the constant element; in it, therefore, and in no doctrine of a phlogistic origin, can I place the essence of this strange disease." This vague description really carries us very little way behind the ideas of Gooch.

Henry Bennet assigned inflammation as the real pathological condition; Rigby thought many cases were due to a rheumatic diathesis; and other authors have from time to time, impelled by the accidental nature of their experience, or the bent which preconceived theories had imparted to their observations, given prominent or exclusive importance to some other complication. If we carefully analyze a large number of cases, noting the complications, and the effects of treatment, we shall find that the cases of "irritable uterus" resolve themselves into the following groups,—viz., 1. In which there is manifest enlargement from congestion of the uterus; 2. Sub-involution with chronic inflammation of the uterus, following labour or abortion; 3. Reclination or flexion of the uterus, most frequently retroflexion; 4. A projecting conical vaginal-portion, with very small os externum uteri; 5. Lateral reclination, mostly associated with imperfect development of the uterus; 6. Disorder of distant organs, especially of the digestive organs, attended or not by one or more of the preceding structural faults, and almost always with impaired sanguification and nutrition; 7. A morbid condition of the ovaries; lastly, a residuum of cases in which, whether from not pushing investigation to the proper point to discover the associated fault, or because there really is no physical fault, we are obliged to conclude that the dysmenorrhœa is simply the expression of nervous disorder. The truth is, that difficult menstruation so exhausts the tone of the nervous centres, that general or local hyperæsthesia is almost certain to follow.

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* New Sydenham Society's Edition of Gooch's Works, 1859.

I think observation warrants this general conclusion:—The healthy, well-formed uterus is rarely an "irritable uterus," or associated with dysmenorrhœa. Or the case may be stated as follows:—For menstruation to occur healthily, the genital canal, from its commencement at the fimbriated extremity of the Fallopian tubes to the vulva, must be easily pervious.

This presumed purely neuralgic dysmenorrhœa we will now endeavour to describe. If we follow a chronological order, and consider first the dysmenorrhœa which is observed at the very outset of the function, we find a number of cases from which we may fairly exclude the idea of inflammatory ulceration or other tissue disease, since these conditions very rarely occur in early girlhood. The reverence due to youth, and pre-eminently to female youth, imperatively forbids physical examination, unless under urgent circumstances and the failure of ordinary treatment. We are therefore precluded in most of these cases from determining in the first instance the presence or absence of uterine flexions and narrowness of the os uteri, which are perhaps the most frequent causes of primitive or initial dysmenorrhœa. Whether the pain be due to recognizable mechanical conditions or not, the phenomena observed are nearly the same. The disorder may be associated with an hysterical disposition; it is generally associated with a highly susceptible nervous temperament, which may be defined as the hyperæsthetic temperament. Extreme susceptibility to pain is one of the penalties of high civilization, and of too luxurious rearing. Hence the neuralgic dysmenorrhœa chiefly affects the easier classes. It is not common, I believe, amongst the labouring agricultural population; but it is by no means infrequent in towns, where, although girls and women may have to work for a living, they are nevertheless exposed to many enervating influences, hygienic and moral.

The first onset of menstruation is generally late; it is marked by pain coming on a day or two before the flow, sometimes so intense that the sufferer writhes upon the floor, and is compelled to take to bed. The pain begins in the pelvic region, radiates to one or both groins, and shoots down the legs. It is commonly paroxysmal, resembling colic—it is, in fact, *uterine colic.* It is often likened to labour. Often the whole abdominal surface is tender to the touch. At times it simulates peritonitis. This pelvic eccentric irritation, commonly involving, as it does, ovarian irritation, propagated to the nervous centres, may evoke other nervous phenomena, as hysteria, vomiting, hiccough, headache, even delirium, and in some cases, mania. Tetanoid rigidity is not uncommon. The urgent symptoms subside in two or three days; the patient recovers so much strength as to enable her to resume her ordinary mode of life. But as the period comes round the same series of painful phenomena is renewed.

The pain is often diminished when the flow sets in, which is often attended by the expulsion of a clot. But it sometimes attends the whole period with more or less severity. It does not appear to bear any constant relation to the amount of the discharge. If there is no recognized organic change in the uterus, or displacement in the first instance, we may be certain that some complication of the kind will appear sooner or later. I coincide in the statement of Scanzoni, that long-standing dysmenorrhœa rarely fails to induce some change of tissue in the uterus, the most common being hyperplasia.

The nervous phenomena described may attend all the forms of dysmenorrhœa. We are thus led to ask: is there any physical condition of the organs concerned that can account for the pain? The colic, the spasmodic character of the pain, seem to indicate a contracting uterus seeking to expel contents that irritate it; and this is often true. But not always. It is a well-recognized character of the nervous function that its phenomena, or actions, have a tendency to periodicity, as if, like electricity, it required a certain degree of accumulation of the *vis nervosa* before it can act. So in the case of pain we often see alternations of acme and of ease, of discharge and accumulation. The fact that the period of most intense pain is usually twenty-four hours before the appearance of blood, is held to prove that these uterine colics or paroxysms cannot be due to anything contained in the uterus, and irritating it to contract. This objection rests upon the assumption that there is nothing but blood, fluid or coagulated, that can be there. But this is overlooked—the rapid preliminary development of the mucous membrane into menstrual decidua, the congestion of this structure, and of the uterus generally. This is enough to cause tension of the uterine muscular fibre, and to excite it to contract, and this swelling of the mucous and muscular walls may close the os internum, and lead to partial retention when the flow begins. The frequent vomiting at this stage favours this view. At the same time, there is the ovarian pain; and to this the hysterical symptoms are most commonly due.

The *course and prognosis* of neuralgic dysmenorrhœa.—The obstinate character of the affection is well known. It may be predicated with some confidence that a girl who starts with dysmenorrhœa is doomed to suffer for years, perhaps for life. It is said sometimes to wear itself out; occasionally marriage, if fruitful, brings relief; but more frequently the recurring attacks of pain, even if unattended by other causes of distress, increase the irritability of the nervous centres, impair nutrition, destroy the harmony or correlation of the vital forces, and reduce the sufferer to the condition of a perpetual invalid, enjoying at the best, only comparative remissions of illness. If pain do not persist throughout the intermenstrual intervals, it is liable to be evoked by any fatigue or emotion, so that the state of the patient comes to be the chief care of the household.

After a time, as R. Ferguson, who draws the most terrible but not exaggerated picture of the affection, observes, the erotic element is in most cases entirely extinguished. "All intercourse is dreaded or loathed, at the very instant when the victim under the passion for sympathetic commiseration is ready to give up her whole soul to the first acquaintance, nurse, or practitioner who will listen and pity. They who have been able to watch this real and most formidable malady through years have many a tale to tell—of husbands estranged, children neglected, and home stripped of all its holiest influences, authority delegated to strangers and abused, ill-assorted marriages, expenditure stretched for health's sake to its extreme limits." Under the goading of repeated agony the occasional resort to stimulants merges into a confirmed habit of drinking.

Happily the recent application of means of exploring the state of the organs primarily affected has, by enabling us to analyze the cases, shown that the majority at least are dependent upon physical causes which admit of remedy. The *treatment* has become far more successful than was contemplated as possible by Gooch and Ferguson. The first condition in which we are likely to be consulted is during the attack. We are called upon, as our first duty, to relieve pain; and during the menstrual flow our hands are commonly tied. We are driven to a trial of sedatives and narcotics. Where the agony is so intense as to induce delirium, it is justifiable to induce anæsthesia by chloroform or chloral, but the frequent recourse to these agents is apt to entail a terrible penalty. The patient who has once or oftener thus drowned her sufferings, is little able to resist the imperious craving to throw herself into the same treacherous oblivion on every return of pain. She soon falls into the habit of exaggerating her suffering so as to impose upon others, as well as herself, the necessity of getting relief, even momentary, at any cost. To say nothing of the fatal accidents which have occurred from the use or abuse of chloroform or chloral, even when skilfully administered, experience shows, it is said, that the repeated or habitual use of these agents is liable to induce epilepsy and mental prostration of a kind to justify apprehension of lapsing into dementia. The use of chloral is only another form of intoxication. It entails like evils. There is no principle of conduct more imperative than this: so to direct our treatment as to preserve and encourage to the utmost the mental and moral integrity of the patient. When once we have lost the aid of her own will, when she has lost the precious gift of self-control, our task is a sad one. We are almost driven into becoming quasi-accomplices in a course that almost infallibly ends in moral annihilation, compared with which the original malady, still subsisting, sinks into insignificance.

One of the best temporary sedatives is Hoffman's anodyne, which may be given in half-drachm doses. To this may be added ten or fifteen drops of liquor opii sedativus, and both act better if given with liquor ammoniæ acetatis. Indian hemp in half-grain or grain doses is often valuable; it may be given alone or combined in pills with lupulin, or five grains of Dover's powder. Where there is a distinct hysterical character, musk, camphor, and assafœtida are often useful. The bromides of potassium and ammonium are of great service. One or other of these may be given in scruple or half-drachm doses every four or six hours. Bromine seems to possess a specific power in subduing ovarian excitation. Apiol capsules sometimes give great relief. If sedatives cannot be taken by the mouth, we may resort to subcutaneous injection of one-eighth or one-sixth of a grain of acetate of morphia; or one-twelfth of a grain of atropia; or half-a-drachm of laudanum may be thrown into the rectum; or medicated pessaries containing opium or belladonna may be placed in the rectum or vagina.

The local treatment in the purely neuralgic affection is restricted to the use of hot fomentations or cataplasms to the abdomen, foot-baths, and other external applications. Simpson recommended the injection of chloroform vapour or carbonic acid gas into the vagina, or the application of a small bit of lint soaked in chloroform and covered with a watch-glass over each groin. This produces a small blister. The diet should be simple, and the use of stimulants reduced to the narrowest limits, if not absolutely excluded.

Moral treatment is of great importance. During the intervals great care should be taken to cultivate habits of industry. Occupation, physical and mental, is the great panacea. "Something to do!" is the great female cry. In no case is it more urgent than here.

If these and other similar means, as well as Time, fail to bring relief, a physical examination becomes necessary, and then we shall probably discover some condition of the pelvic organs, on the successful management of which the hope of curing the dysmenorrhœa will rest.

The *Congestive Dysmenorrhœa* may be either *primary*, dating from the commencement of menstrual life, or *secondary*, acquired at a later period. The primary cases do not differ essentially in their symptoms from the neuralgic cases; and until examination by touch is made they can only be conjecturally distinguished. In addition, perhaps, to the subjective signs marking the neuralgic kind, there is a greater sense of weight and bearing-down in the pelvis, pain referred to one or other ovarian region, principally the left. It is difficult to derive any precise information from external palpation, because in congestive as well as in neuralgic cases, the hyperæsthesia is often so great that the patient shrinks from that amount of pressure which is necessary to fairly depress the abdominal wall. Vaginal touch, too, is often difficult for the same reason, and it may become desirable to conduct it under chloroform. In single women, rectal touch is free from some of the objections applying to vaginal, and may even give better diagnostic results. We then ascertain that the uterus is somewhat enlarged, and on returning consciousness the patient complains of pain on pressure. There is also a peculiar sense of tension and heat. Of course in the case of simple congestion we assume a normal uterus as to structure, form, and position. But this coincidence, I believe, is rare. A normal uterus will generally perform its function normally. The physiological blood-fulness, which is an essential condition of every menstruation, is different from congestion, which is a morbid process. The physiological state is relieved by excretion. The morbid state is only partially so relieved; some of the blood-elements remain, keeping up more or less tension of the blood-vessels, and the serum is effused into the tissues. Hence congestion is liable to induce some degree of permanent enlargement, which may even lead to hypertrophy. This enlargement is perceptible to the touch in the intermenstrual intervals. It induces relaxation of the pelvic tissues which support the uterus; hence, from increased weight and lessened support, the uterus tends to sink lower in the pelvis.

What is the cause of this congestion? We can hardly conceive the idea of primary congestion. This condition is almost necessarily the consequence of some morbid process or injury. These are manifold, and will be discussed under their appropriate heads. But in especial reference to the present subject, it must be remembered, that an organ which performs its functions with difficulty, is by that circumstance disposed to congestion. Thus the simple neuralgic dysmenorrhœa is pretty sure to merge sooner or later into the congestive form. We may go further, and affirm that the congestive dysmenorrhœa, if not primarily due to a mechanical impediment, is certain to produce a mechanical impediment to excretion, chiefly marked at the menstrual epochs, thus increasing the pain. The tumefaction of the mucous membrane fills up and chokes the cervical canal, especially at the os internum. Here then is a mechanical obstruction to excretion. If the disease continues, the body of the uterus, increased in size, and all the surrounding structures, upon whose healthy tonicity the uterus depends for maintenance of its form and position, being relaxed, is liable to fall back in retroflexion. This necessarily increases the obstruction at the angle of flexion, that is, near the os uteri internum. Although I believe this is the history of some cases of retroflexion, I am very sure that in the majority the retroflexion is the primary condition. We are thus by several routes led to the discovery that mechanical obstructions to excretion are the most important factors in dysmenorrhœa.

Obstructions vary in seat, extent, and kind. They are most frequent at one of the natural orifices of the genital canal. Thus, narrowing of the os uteri internum, as brought about by flexion or angulation, is not uncommon; narrowing of the os externum is very common. But like results may attend narrowing at any other part of the canal, as in the vagina. If the closure be complete, and menstruation takes place, of course there will be retention. If the closure be incomplete there will be partial retention, the expression of which is dysmenorrhœa. This partial retention and dysmenorrhœa we know is extremely common. Its phenomena should, I think, be studied in connexion with those of complete retention. This subject is discussed under "Atresia." We shall find in this study endless illustrations of the proposition that one essential condition of dysmenorrhœa is *retention of menstrual secretion.* There is another condition to which retention of secreted matter is not necessary. In many cases where there is congestion of the uterus combined with extreme nervous susceptibility, the pain is most marked at the outset of the period, that is, in all probability, before any pouring forth of blood into the uterine cavity has taken place. The pain is explained by the sudden distension of the morbid uterine tissue by the gathering of the blood in the vessels preliminary to secretion, and the swelling of the mucous membrane. In both there is retention, the difference being that, in the one case the menstrual blood is retained in the cavity of the uterus after secretion, and that in the other case, the blood is retained in the tissues of the uterus. The point which brings both cases together is that there is difficult excretion, causing distension of the uterine fibre, and nervous irritation.

The residual cases, which do not fall under one or the other description of retention, are rare indeed.

I have seen many cases in which long-standing dysmenorrhœa was cured by incision of the os externum, relapse occurring when the os contracted again; and a permanent cure was obtained when the os was kept patent.

In cases of anteversion and anteflexion, without stenosis, dysmenorrhœa has been from time to time relieved or averted by the passage of a sound a day or two before the onset of menstruation. By this means and rest the uterus was redressed for the occasion, and the obstruction and retention were averted. If this measure was at any time omitted, the dysmenorrhœa was sure to come, and the body of the uterus became very sensibly enlarged. Permanent cure has commonly followed permanent restoration of the uterus to its proper position.

Another cause of dysmenorrhœa, and often of menorrhagia, is the fixing of the uterus by perimetric deposits, coming on after labour or abortion, or other conditions. The fixing of the uterus, although commonly attended by patency of the cervix, seems to cause dysmenorrhœa by favouring engorgement and impeding the contraction of the uterus.

Dysmenorrhœa not seldom attends upon fibroid tumours, which produce obstruction by twisting or compressing the cervical canal, by keeping up a state of congestion, or by interfering with the effective regular contraction of the uterus.

Many other illustrations will occur of pain analogous to that of dysmenorrhœa, produced by the retention in the uterus of blood-clots, as after labour and abortion, of intra-uterine polypi, of the exfoliated membrane in the dysmenorrhœa membranacea, or, in fact, of anything which distends and irritates the uterine cavity. The difference in the symptoms, and the degree of severity, depend not so much on the nature of the substance retained, as upon the completeness of the retention and the nervous susceptibility of the patient.

A further proof that dysmenorrhœa is due to retention lies in the changes the menstrual fluid undergoes, and the character it presents when discharged. In some cases, especially those in which there is such excess of blood as to deserve the designation of menorrhagia, the escape being impeded, and the mucous secretions of the cavity of the uterus being insufficient in proportion to preserve the normal state, clots form. In other cases, in which there may be no excess of quantity, the retention is so protracted, or the quantity of catarrhal mucus mixed with it so large, that the fluid when discharged closely resembles, in its syrupy consistence and dark colour, that which is pent up by an imperforate hymen. This is markedly so in some cases of temporary retention from compression of the cervical canal by a fibroid tumour. But it is not uncommon in obstruction from retroflexion, and from stenosis of the os externum. The discharge is also often offensive to the smell.

With all this variety of illustration concentrated into one focus, we shall be justified in repeating the proposition with which we started, namely: The essential cause of dysmenorrhœa—at least, in the great majority of cases—is retention of the menstrual secretion. The exceptions in my experience are very few. And yet among these few exceptions there are some which I should hesitate to consign to the neuralgic asylum.

We meet with cases, every now and then, in which the dysmenorrhœal symptoms are very severe, although there is no obvious stenosis. In some of these I have found the uterus small, perhaps inclined to one side, set in a short, non-distensible vagina. Sometimes the os externum is preternaturally small; but even after freely dilating this, the dysmenorrhœa persists. The subjects of this kind of imperfect development—for such it is—are commonly of a highly nervous temperament, acutely sensitive of pain, and it would be easy to say they suffer from "irritable uterus," or neuralgic dysmenorrhœa. But this refuge seems unsatisfactory. In some of the subjects it is certain that the hyperæsthetic condition has been gradually developed, caused by the frequent pain and imperfectly performed function, and was not a primary condition.

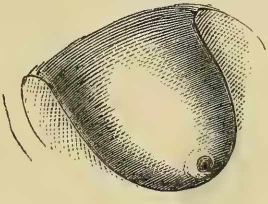

FIG. 65.

SHOWING ONE FORM OF THE CONICAL VAGINAL-PORTION (R. B.).

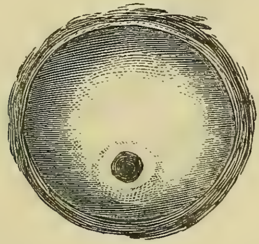

FIG. 66.

SHOWING A COMMON FORM OF NARROW OS UTERI, ATTENDED BY DYSMENORRHŒA AND STERILITY (R. B.).

DYSMENORRHŒA FROM OBSTRUCTED EXCRETION.

The principal mechanical anomalies associated with dysmenorrhœa are: Narrowing of the os uteri externum, with or without projecting conical vaginal-portion (Figs. 65, 66); retroflexion or retroversion; anteflexion, or anteversion of the uterus; lateriversion; torsion of the uterus (Figs. 24, 26); inflammatory and hyperæmic states of the uterus; fibroid tumours in the walls of the body, and especially in the neck of the uterus; polypi; tumours or effusions outside the uterus, pressing upon it, such as pelvic peritonitis, or perimetritis, and retro-uterine hæmatocele, which impede its mobility, and keep up hyperæmia. These conditions may exist simply, or two or more may be combined. I propose now to discuss, in relation to dysmenorrhœa, the narrow os, and the displacements of the uterus. The other conditions will be studied under their appropriate heads.

I have sketched the most common forms of conical vaginal-portion and stenosis of the os externum in Figs. 65, 66, and 67. They are mostly congenital, and may be traced back to imperfect development. The vaginal-portion may project into the vagina half an inch, an inch, or even as much as two inches. Sometimes the vaginal-portion is rounded, representing the half of a globe. In some cases the excessive projection is due to acquired hypertrophic elongation of the infra-vaginal-portion. In the normal construction the cervical canal communicates freely with the vagina by an open transverse fissure; inclining, indeed, to the circular form in the virgin. The form of the cervical cavity is thus a flattened cone or funnel, of which the base is open (see Fig. 18, p. 36). The vaginal-portion projects as a flattened hemisphere scarcely half an inch into the vagina, the vagina being reflected off from the cervix a little above the level of the os externum.

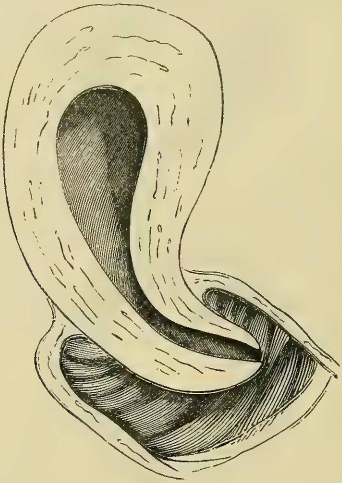

FIG. 67.

SECTION SHOWING CONICAL CERVIX WITH SMALL OS EXTERNUM (R. B.).

Instead of the natural free communication between the cervical cavity and the vagina, the os externum is so contracted as to form a sensible obstruction, the uterine sound passing only with difficulty. As soon as the os uteri externum is penetrated by the sound, it is usually found that the point enters into a fairly capacious cervical cavity. This narrows again towards the os uteri internum. In cases of protracted suffering from dysmenorrhœa attending this peculiar form of cervix, I have, however, generally found that the sound passes through the os internum without difficulty. I concluded that in some cases the excessive projection of the vaginal-portion is simply due to the vagina being reflected off at a higher level than usual. The sound shows the entire length of the uterus to be normal.

The seat of the obstruction, then, I believe to be most commonly at the os externum. The obstruction is due chiefly to the small round os itself; partly to the pointed elongated form of the lower part of the vaginal-portion; and partly to an unusual rigidity of structure of this part, which impedes the expanding action natural to the healthily formed os uteri.

When obstruction is experienced at the os internum, I have almost always found it to be due to the flattening of the canal at this point, caused by extreme flexion or angulation of the body of the uterus upon the neck. The sound will generally pass, by giving it a moderate curve, by tilting up the down-bent body with a guiding finger, and carrying the handle of the sound well backwards in the case of anteflexion, and *vice versâ*.

The *consequences of the described obstructions* take place in retrograde or ascending order above the seat of obstruction. They are: 1. Congestion and enlargement of the body of the uterus, disposing to menorrhagia at first, and causing uterine spasm and colic; 2. A similar condition of the Fallopian tubes, and tendency to undue patency of the uterine mouths of the tubes; 3. Congestion, enlargement, inflammation of the ovaries, determining (*a*) intra-alar hæmorrhage, (*b*) retro-uterine hæmatocele, (*c*) limited pelvic peritonitis, with or without adhesions of tubes and ovaries to surrounding structures; 4. As an ulterior result, continued obstruction may entail, through the action of inflammation or long interference with function, atrophy of the ovaries, and extinction of the menstrual phenomena.

All the above consequences may occur in single women.

When the subjects of uterine obstruction enter upon married life, other consequences are added. These are: increased congestion and inflammation of the body of the uterus; increased liability to ovarian irritation; increased tendency to menorrhagia; acute and chronic cervicitis with leucorrhœa; vaginitis; vaginismus; dyspareunia: sterility; or, in the rare event of impregnation, abortion or dystocia. A history of abortion is generally to be mistrusted. A presumed abortion is likely to have been nothing more than menorrhagia. The barren woman would fain console herself with the delusion of a blighted hope. Of course it is not intended to convey the idea that these consequences are, one and all, constant. But I believe it is rare for the subject of narrow os externum uteri, alone or combined, as it frequently is with retroflexion of the uterus, to escape from some of them. Dysmenorrhœa, dyspareunia, and sterility will commonly follow; and, continued through the period of ovarian activity, will render life miserable, even if health be not utterly broken down.

The *symptoms* of dysmenorrhœa from obstructed excretion express the several pathological conditions which are called into action. Pain is the most urgent symptom. This usually comes on as a heavy aching sensation, even before the flow appears. The seat is pelvic, spreads to the sacrum, loins, one or both iliac regions, and often extends down the thighs. As the flow appears there is sometimes relief from pain, but more commonly it assumes an expulsive bearing-down character. It rises sometimes to such intensity that the patient is obliged to take to bed. The constitutional reactions of this pain are often great. Prostration approaching to collapse may ensue, violent headaches, syncope, retching, vomiting are not infrequent. I have witnessed marked stupor and hebetude, loss of memory, loss of energy, want of all power of fixing attention, delirium, even mania. These symptoms subside, or are mitigated as the flow ceases, but occasionally last for several days, leaving the patient so exhausted and depressed in body and mind that she has scarcely time to rally before the next period returns, when all her distress is renewed. That these symptoms depend chiefly upon the hyperæmic state of the uterus seems proved by the observation repeatedly made, that touching the cervix or fundus with the finger will produce the same phenomena, and that the uterus is really enlarged and painful. Enlargements of the abdomen from perverted nervous action, resembling those which occur at the climacteric period, are frequent at the menstrual periods. The breasts also frequently enlarge at these times, and become painful, in response to the ovario-uterine distress. The effect upon the menstrual function varies. In one class of cases menorrhagia is induced, the result, no doubt, of the extreme hyperæmia caused by the obstruction. In these cases the intermenstrual interval is often reduced to three weeks or less, whilst the flow persists for a week or longer. Clots are frequently passed, indicating retention in the cavity of the uterus. The case then resembles abortion, and, not seldom, patients believe they have aborted. The menorrhagia is commonly followed by leucorrhœa, another means which Nature adopts to lessen the hyperæmia. More or less pain often persists throughout the interval, and is liable to exacerbation on any exertion or emotion. This is due to the continuance of hyperæmia, and even to some hypertrophy of the uterus.

When dysmenorrhœa depends upon obstruction of the os externum or retroflexion or anteflexion, it commonly begins with the first advent of the ovarian function, and continues in spite of all ordinary treatment. I have notes of a case which shows in a striking manner the severity of the symptoms sometimes produced. A young lady had been married two years without pregnancy. Since marriage she had suffered from metrorrhagia, and several attacks considered to be, and treated as, peritonitis. During the last six months she had a constant sense of swelling, with pain in the left ovarian region; vomiting attended the pain. This had been relieved by leeching. When I saw her, metrorrhagia had lasted six weeks without cessation. Great prostration was present, with irritative fever, reminding me of pyæmic puerperal fever. I found a small conical cervix, with an os so minute that it required considerable pressure to introduce the uterine sound; the cervix was deviated to the left; there was defined tumefaction and pain in the left ovarian region. I inferred that the narrowed os externum, impeding the flow of blood from the uterus, led to the formation of coagula in the cavity; that these coagula were broken up by decomposition; that absorption of septic matter took place, causing constitutional symptoms, and possibly peritonitis or cellulitis in the left broad ligament; that the tumefaction in the left broad ligament might also be due to hæmorrhagic effusion, or to congestion of the ovary. I split the cervix with my scissors. The metrorrhagia, which had persisted for six weeks, and was abundant at the moment of the operation, ceased in a few days, the pain abated, and recovery ensued.

Passing the sound, however gently, commonly causes a little bleeding. This is evidence of extreme hyperæmia and also of a morbid condition of the cervical mucous membrane, in which the epithelium is easily shed. This is further shown by the frequent escape of a muco-purulent offensive discharge, when the os externum is opened by incision.

The association of painful menstruation, uterine hæmorrhage, and sterility, with a peculiar formation of the os uteri, has long been recognized. Indeed, this fact in pathology appears to be simply a recovered legacy from the most remote epoch of medical history. There is a passage in Aëtius, in which not only is the dependence of sterility upon a contracted os uteri pointed out, but the supposed modern treatment of dilating it by compressed sponge-tents is also described. The late Dr. Macintosh was mainly instrumental in reviving and applying this knowledge to practice. Professor Simpson in Edinburgh, Dr. Oldham, myself, and others, in London, accepted the doctrine. On the Continent it has met with less favour. But in America it is almost universally recognized.

Opinions differ as to the exact nature and seat of the obstruction. If the obstruction be always, or even often, at the os internum, as some contend, it follows that treatment must be directed to the dilatation of this part. Now, dilatation of this isthmus by bougies or expanding tents is attended but with transitory results. The isthmus very soon regains its ordinary calibre. Dilatation of this part by incision is not only of transitory result, for the isthmus quickly contracts again, but it is attended by great danger. The blood-vessels enter the cervix just about this level; some penetrate deeply into its structure, and the venous canals are maintained as more or less rigid tubes. An incision half an inch, or even a quarter of an inch deep will be very liable to divide some of these vessels. Hence, as a first danger, we have to apprehend profuse, even "furious" bleeding; next, from the gaping of the divided veins and the injury to the tissues in which they run, there is great liability to pelvic inflammation and septicæmia. These are no theoretical dangers. Many cases, some fatal, are well known. To illustrate this point, I made many sections at the level of the os uteri internum. The disposition of the vessels is shown in Fig. 68. The same figure shows, what almost every section at this level shows, that the natural calibre of the isthmus will just about admit the passage of the uterine sound. This coarctation has been demonstrated to be normal by Dr. H. Bennet in the living, by Boullard in the dead, and is no longer disputed. No operation, then, is needed to make it larger. If the sound will pass, we may be satisfied as to the efficiency of the os uteri internum; and in my experience it is very rare indeed to find serious difficulty in passing it. If it does not pass readily, by far the most common cause is excessive flexion of the body upon the cervix. This is overcome by the skilful use of the sound. What need, then, to enlarge the orifice by incision? Will incision help to straighten the uterus? The rational course is, where there is obstruction from angulation to attack the flexion.

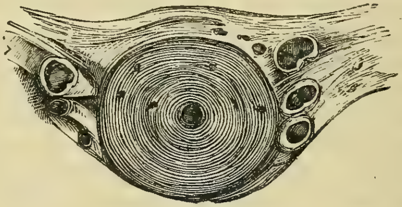

Fig. 68.

SECTION OF UTERUS MADE AT OS INTERNUM (AD NAT.).

Showing the normal size of the os internum, the circular disposition of the fibres around it, and the blood-vessels in proximity (R. B.).

Before describing the operation of incision, it is proper to describe and to discuss the value of the methods of dilating by bougies and tents. This was first done in recent times by Macintosh, and has been largely followed. It had been practised by Paré. Various dilating materials have been used. One was to fashion a tent made of ivory out of which the bony matter was taken by hydrochloric acid. Such a tent, when applied inside the cervix uteri, will swell to about double its ordinary size, and so distend the canal in which it is placed. Metal bougies have been applied of gradually increasing size, as for stricture of the male urethra. Steel sounds provided with a mechanism for expanding after introduction into the cervix have been advocated. Of late the favourite agents have been compressed sponge and laminaria tents. The sponge is made into a conical form and waxed over. Tents of this material, when introduced, soften and swell by imbibition of the fluids secreted.

The patient should be undressed, in bed, and lie on her left side, knees drawn up. To introduce the sponge-tents, first of all pass the uterine sound to determine accurately the dimension and direction of the canal.

The laminaria tents are now usually made about two inches long and hollowed out, that is, tubular. I have contrived a very convenient instrument (see Fig. 49) to carry them into their place, which has been sold by the London instrument makers for several years. A suitable laminaria-tube is mounted on the stilet, when it virtually forms part of the equivalent of a uterine sound, and is almost as easy to introduce. The forefinger of the left hand, serving as a guide, is applied to the edge of the os uteri, whilst the instrument carrying the tent is handled by the right hand. The tent end is carefully slipped up, until nearly the whole length has passed the os externum. By this, and also by a sense of resistance overcome, we know the os internum has been passed. Then, keeping the forefinger on the os, withdraw the handle of the instrument, whilst the catheter is kept steady against the os. The stilet thus withdrawn from the laminaria-tube, this is left *in sitû.* To secure it here, until it swells, when it will hold itself, plug lightly with lint soaked in carbolic acid oil.

The tent takes about six or eight hours to swell to its full extent. If the constriction be rigid, or the patient very susceptible, it is not uncommon for vomiting and pain to come on when the excentric pressure stretches the uterine fibre; it is therefore desirable to give a sedative an hour or two after the application. The necessary time taken for the action of the tent suggests a practical rule in the selection of the hours for introducing it. It will combine the least distress to the patient with the greatest convenience to the surgeon, to introduce the tent in the evening, and to visit her early in the morning to remove it; or, it may be introduced in the morning and removed in the evening. The os internum yields with most difficulty. Sometimes the tent is gripped at this point so forcibly, that a deep furrow or circular constriction is formed, and the part of the tent over this point having expanded freely, considerable resistance is opposed to the removal.

What is the effect of these measures? The immediate effect is undoubtedly to expand the cervical canal. A laminaria-tube, the size of a No. 8 bougie, will so expand the canal that it will admit the finger. The irritation produced by the presence of the tube causes a free secretion of mucus, which lasts for a day or two. But in a very few days it has contracted to its old diameter, and matters are *in statû quo.* To meet this, the operation has been repeated time after time, either until the patience of the sufferer was exhausted, or until serious accidents arose.

The accidents attending the process are not inconsiderable, and have been too much underrated by those who prefer dilatation by tents to incision, on the mistaken presumption that incision is more dangerous. Numerous cases have occurred of pelvic cellulitis or peritonitis, and some of septicæmic fever after the use of sponge-tents; and similar accidents have followed the use of laminaria tents. Marion Sims relates several such cases, some so severe as to threaten to be fatal. Dr. L. Aitken* relates others, and one in which retro-uterine hæmatocele also occurred. He insists upon the very proper caution that they should not be used when there is any inflammation. The risk of septicæmia may be lessened by using tents saturated with weak solution of iodine or carbolic acid. We may then conclude that the use of tents to dilate the cervix uteri is not efficient, and does not possess the advantage of being safer than incision.

The operation of *Dilatation by Incision.* I have already pointed out the objections to dividing the os uteri internum. By eliminating this proceeding we greatly lessen the danger, and do not, I believe, diminish the benefit of the operation. Further to lessen the danger we must eschew a class of instruments which must be regarded rather as machines than as surgical instruments. I am very unwilling to underrate the ingenuity which has been displayed in the contrivance of the various two-bladed metrotomes. It is, however, against these that my objection is urged, and especially against the most ingenious in its mechanism of all, that of Dr. Greenhalgh. This is adapted to divide the os internum, and therefore is already excluded by the reasons advanced against this proceeding. It moreover exceeds the rest of the two-bladed metrotomes in its automatic character. The blades cut as they are set, beyond observation of sight or touch; the incisions they make cannot be regulated according to indications obtained during the operation. The blades may be of unequal sharpness. Now, the thickness of the cervix uteri at the place of incision, and the nearness to which the vessels may approach the inner surface, are not absolute invariable quantities. Setting the blades to diverge one-eighth of an inch only beyond the limit of safety—a limit which it must be borne in mind we are unable to determine—will involve the dangers of hæmorrhage and septicæmia. Moreover, there may be obliquity of the uterus; and difference in thickness and density on the two sides. I have been informed of one case in which one side of the cervix was so completely divided that an opening was made into the peritoneal cavity.

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* "Edin. Med. Journ.," 1870.

The objections stated apply, although with less force, to all two-bladed metrotomes, even when designed to cut the lower or vaginal-portion of the cervix only. The degree to which this portion projects into the vagina varies greatly. Thus, in some cases the vaginal-portion forms a conical mass, projecting an inch and a half into the vagina, whilst in others there is hardly any projection, the os uteri being almost flush with the vaginal roof. It is difficult to work two blades simultaneously with the required precision in all cases. It is generally safe, although unnecessary, to divide all that part which projects into the vagina. But where the cervix is entirely supra-vaginal, a degree of nicety is required which it must be difficult to secure with two blades working at once.

As a preparation for the operation, it is well to secure a day's rest beforehand, and to clear out the bowels by an aperient and enema. The best time to select is during the week following a menstrual period.

The *operation*, as I now perform it, is as follows:—The necessary instruments are: my crescent-speculum (see Fig. 42); a uterine sound, a Küchenmeister's (see Fig. 45), or Simpson's (see Fig. 46) single-bladed metrotome, and a Sims' single tenaculum-hook (see Fig. 47). The patient lies in bed, undressed, the nates drawn well up to the edge of the bed, the thighs flexed, the head resting on a pillow in the middle of the bed, the shoulders being kept low. I have not usually induced anæsthesia. The operation, although annoying, is not protracted, and only in rare cases very painful. Where, however, the patient is very nervous, it is better to give chloroform or ether.

The sound is introduced to take exact survey of the direction of the cervix and uterus. The speculum is then introduced so as to bring the vaginal-portion well into the field. The advantage of my speculum is here seen in its bringing the vaginal-portion forward, so that in almost every case it can be touched with the finger. The probe blade of the scissors is passed into the cervix from half an inch to an inch, and the part intervening between the blades is divided by a quick stroke. The blades are then reversed, and the opposite side of the cervix is dealt with in like manner. Generally, if Küchenmeister's scissors are used, the hooked blade having secured the part so as to prevent it slipping back under the stroke, the operation is now completed. But if other scissors are used, it is desirable to hold the vaginal-portion steady by Sims' tenaculum during the cut. The operation may be done with Simpson's metrotome instead of scissors, and sometimes when it is found that the scissors have not cut sufficiently, Simpson's instrument may be used to complete the incisions.

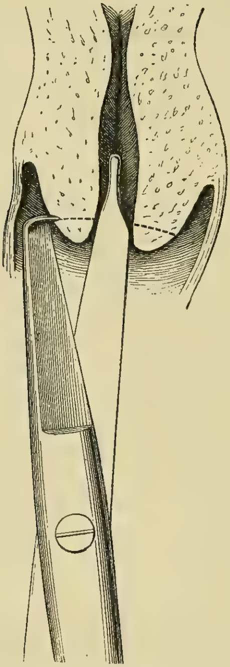

Fig. 69.—(Full size.)
SHOWS THE ACTION OF KÜCHENMEISTER'S SCISSORS IN ENLARGING THE OS UTERI EXTERNUM (R. B.).

The operation, if scissors alone are used, is thus necessarily limited to the vaginal-portion; that is, it is by the very conditions of the operation kept within the bounds of safety. It is not often necessary to divide the vaginal-portion quite up to the angle of reflection of the vagina. It is enough to make a fair transverse slit, or os tincæ, which shall give free communication between the cavity of the cervix and the vagina. Indeed, Dr. Peaslee contends that a very slight incision is all that is necessary.

The division of the cervix is sometimes followed by nervous disturbance out of all proportion to the severity of the operation. This is greatly emotional, and depends upon the susceptibility of the patient, and of the degree of mental tension sustained before and during the operation. The consequence is generally restlessness, sometimes hysteria. In the event of sleeplessness, nervous disturbance, or pain, it is proper to provide a sedative to be taken at night. Occasionally there is retention of urine during the first twelve hours.

The after-treatment is simple. To avert the risks of hæmorrhage and inflammation, the patient should keep her bed for four days, and not be allowed to leave her room under a week. The ordinary diet may be given. It is important to avoid stimulants. The sound may be passed on the fourth day, to lightly part the freshly-cut lips of the wound, and secure against reunion. When the operation has been performed as described, and these precautions have been observed, I have never seen any serious symptoms arise. Where symptoms of peritonitis have occurred it has generally been from getting up too soon, from exposure to cold, or undue excitement. It is not, however, possible to affirm absolutely that in even the most favourable condition there is no risk. The simple passing of the uterine sound for the purpose of diagnosis, has been followed by pelvic cellulitis or peritonitis. But with due care the risk of danger from the operation is infinitely small, and not to be compared with the protracted and repeated suffering and danger attending the obstruction which the operation is designed to remove.

In the event of secondary hæmorrhage occurring, as it sometimes will, within the first twenty-four hours, it is well not to trust to ordinary plugging. The most satisfactory plan is to introduce the speculum, to bring the os uteri well into view, to wipe away all blood, to seize one lip with a Sims' tenaculum-hook, so as to open the os, and steady it; then to insert into it a small strip of lint, soaked in perchloride of iron or tincture of iodine. This direct application of the styptic is generally effectual. When the styptic plug is applied, the vagina may be packed below by strips of lint, soaked in carbolic acid oil.

Immediately after the operation, or on the next day, it is generally useful to insert an intra-uterine pessary. I formerly used Wright's. I now prefer my galvanic coil pessary. Its flexibility adapts it more easily to the uterine conditions. It tends to straighten the uterus without injurious rigidity, and it stimulates development. Pregnancy has more frequently followed since I adopted this instrument.

Results and appreciation of the operation.—The operation as described, or as modified according to the views of different practitioners, has certainly now been performed some thousands of times. The accidents that have attended it are almost all explained by the imperfection of the methods adopted, or by the neglect of proper precautions. At one time Professor Simpson and some others regarded the operation as so slight, that they did not hesitate to perform it in their consulting-rooms, sending the patients home in cabs immediately afterwards. Bleeding and peritonitis were not uncommon results of this practice. I have seen several cases of chronic pelvic cellulitis arising in this manner; and some cases of fatal bleeding are known to have occurred.

The wished-for result is not always immediate. In a certain number of cases, indeed, the next ensuing menstruation is perfectly easy, and future immunity is attained. But not infrequently, the first period or two after the operation are even more painful than before. This may be accounted for by the congestion which remains after the operation, and by the extreme nervous irritability of the subject. The sympathetic distension and pain in the breasts, a frequent concomitant of dysmenorrhœa, is commonly relieved or removed after the operation.

That relief should not be immediate is not surprising, when we consider the state to which protracted suffering and impaired nutrition have usually reduced the patient. The balance of the nervous system has to be restored; every tissue in the body wants regeneration. For this, time is essential. In the great majority of cases, relief more or less complete is gradually established within six or eight months, and ultimate entire disappointment is quite exceptional. One benefit is immediate. Where there has been great congestion or inflammation, this is almost instantly relieved by division of the vessels. It acts like scarification or leeches.

Success is in proportion to the earliness of treatment. If carried out whilst the patients are comparatively young, and within two or three years of marriage, the prospect of complete relief is very great. In a considerable proportion of cases pregnancy has followed. But even after the age of thirty, success more or less decisive is still the rule. The important point is to operate before secondary changes in the uterus and ovaries have been established.

Amongst those who have criticised the operation with most minuteness and authority, stands Scanzoni.* His objections are partly theoretical, partly clinical. They are aimed at the operation as a remedy for sterility, and as a remedy for dysmenorrhœa. These conditions are so frequently associated in nature, that it is not easy to discuss them apart. One argument for the division of the narrow os uteri lies in this, that the narrow os obstructs alike the outward excretion of the menstrual fluid and the ingress of the seminal fluid, and hence the corollary that enlargement of the os may be expected to remove both difficulties. Now, Scanzoni admits that the dysmenorrhœa is frequently relieved, but contends that the sterility persists notwithstanding. Thence, he urges that far too exclusive importance is attached to the mechanical hindrances to the meeting of the semen and ova. He says, we know as yet little as to the influence of the various morbid conditions upon the fertility of the semen and ova. Diseases of the testicle, it is known, sometimes lead to the absence of spermatozoa. May not the frequent diseases of the ovaries lead to the production of diseased or defective ova? Manifold experience proves that, during extreme anæmia, conception does not take place. Here is a proof that in the case of the ovaries, as in that of other glands, a bad condition of the blood leads to bad secretions—ova incapable of fructification. Another series of difficulties arises when we consider the indispensable locomotion of the semen and of the ovum. It is only necessary to call to mind the frequent abnormities of the Fallopian tubes met with in autopsies, such as congenital or acquired shortenings, dislocations, adhesions, which are completely beyond clinical diagnosis. Scanzoni then puts the case of typical dysmenorrhœa with narrow os uteri and sterility. The os is split, the dysmenorrhœa is relieved, but the sterility continues; and Scanzoni asks, must it not be admitted that there is here a cause of sterility which lies in other and unknown conditions?

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* Scanzoni's "Beiträge," 1870.

This may be freely granted. The cure of the sterility is not nearly so frequent as the cure of the dysmenorrhœa. Impregnation is a far more complicated process than menstruation. But is the cure of dysmenorrhœa unimportant? The suffering attending this condition it is which urges by far the greater number of patients to seek advice. The sterility is with many a secondary consideration, or does not so much as enter into their minds. In a considerable number of cases conception does follow; and the chance, if only a remote one, will be esteemed worth taking. It may, then, be assumed as in the highest degree probable, that the narrow os uteri is *one cause of sterility*. It is perfectly logical and good practice to remove this cause, giving the patient the possible benefit of its being the only cause. Sound clinical reasoning dictates that we should eliminate all the known complications of a morbid state, and not leave them to harass a patient because there may be others which we cannot relieve.

A further reply to Scanzoni's objections is justified by observation. He insists upon the frequency of abnormities in the Fallopian tubes and ovaries, met with in autopsies, which are completely beyond diagnosis. Now, it is in a high degree probable that some, if not many of these very abnormities, especially inflammatory adhesions and altered conditions of the ovaries, are the consequence of the narrow os uteri, and might have been prevented, had this obstruction to menstruation been removed at an early period of life. This opinion is based upon three orders of facts which have come under my observation. First, the removal of sterility, as well as of dysmenorrhœa, is probable in proportion to the early removal of the obstruction. I have repeatedly seen women who had passed one, two, or three years of married life without pregnancy conceive within two or three months after the operation, whilst women who had remained sterile for ten years or more were cured of the dysmenorrhœa only. The second clinical fact is, that I have frequently observed symptoms of peritonitis attending dysmenorrhœa; occasionally I have seen retro-uterine hæmatocele, both of which conditions will leave adhesions. The third fact is, that in single and married women who have suffered some years from dysmenorrhœa at first attended with menorrhagia, the menstrual discharge gradually tended to disappear, sexual indifference set in, the uterus underwent marked atrophy; in short, that premature sexual decrepitude had been produced, depending probably upon atrophy of the ovary, which itself was probably the result of inflammatory adhesions, or of the protracted struggle against impeded function.

OVARIAN DYSMENORRHŒA; DYSOOTOCIA; OOPHORIA (HYSTERIA); TUBAL DYSMENORRHŒA.

When we reflect upon the importance of the ovary in the function of menstruation, upon the structure of the organ, and the activity of the processes going on in it, we shall not be surprised to find that dysmenorrhœa is sometimes due to conditions of the ovary. The ovary is, as we have seen, the *primum mobile* of menstruation; the first and most important part of the function takes place in its structure. This part of the twofold function is ovulation or ootocia; the uterine part consists in the secretion of blood. Difficulty in the ovarian part of the function, then, means difficult ovulation, a distinct thing from difficulty in the secretion and excretion of the menstrual blood, which is the duty of the uterus. It is very important to keep this distinction in mind. Dysmenorrhœa fails to express the idea of difficult ovulation; and, thus failing, we are apt to lose sight of the clinical fact that in many cases the source of the distress lies in the ovary. I have therefore sought to designate difficult ovulation by a term in accordance with medical nomenclature.

After consultation with Dr. W. H. Stone, I venture to propose the word "Dysootocia."*

The clearest cases of ovarian dysmenorrhœa are those where there is pain at the menstrual periods, and no uterus, or only such an imperfectly-developed uterus as to be unfit for its function. In these cases the cause of distress seems, *ex necessitate rei*, concentrated in the ovaries. I have observed signs of local fulness with pain; but the chief distress has been in the nervous centres; severe headaches, with such mental disturbance, marked by prostration, as to lead to fear that the mind would give way. Strange to say, I have known two cases of this kind to be almost completely relieved when a vagina had been made by dissecting up, although no menstrual flow was established.

But when the entire sexual apparatus is well developed, the ovaries still may exhibit the only signs of periodical activity. There is the monthly pain in one or other iliac region, the increased nervous irritability, perhaps general vascular excitement or tension, leading possibly to Schneiderian epistaxis; but the uterus takes no obvious part in the effort.

These cases show that an attempt at ovulation is often made, and that the menstrual effort is exhausted in this attempt, no uterine menstruation occurring. These cases are usually classed under amenorrhœa; but, strictly, they should be called cases of imperfect or abortive menstruation. They are really very common.

A form of ovarian dysmenorrhœa which I have noted, occurs in connexion with commencing ovarian disease. In many cases of ovarian dropsy I have ascertained that for some time preceding the development of the tumour, or the suspicion of it, dysmenorrhœa has been complained of. In some cases I was able to ascertain that there was no complicating uterine abnormity to account for the trouble. It seems to me, therefore, reasonable to infer that the dysmenorrhœa was due to the morbid process going on in the ovary. In other cases where the ovarian tumour began at the end of sexual life, dysmenorrhœa was not complained of. But no doubt there are exceptions to both these rules.

The cases described by Dr. Priestley,† under the title "Intermenstrual or Intermediate Dysmenorrhœa," should, I think, be classed as cases of ovarian dysmenorrhœa. Severe pain is felt midway between the periods, and commonly ceases before the flow sets in. The suffering is referred to one or other ovarian region; and in three cases out of four referred to by Dr. Priestley, marked tumour, or thickening from old adhesions, was found in that locality. He conjectures that the pain is due to commencing ovulation-process, in ovaries affected by thickening of the indusium. I have seen a considerable number of similar cases. In some there was uterine complication, which may, however, have been secondary.

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* From δὺς- and ᾠοτὸκεω, to lay eggs.

† "Proceedings of Med.-Chir. Soc.," 1871.

The existence of adhesions or marked tumours, observed by Dr. Priestley in his cases, is by no means necessary to the production of ovarian dysmenorrhœa. At least, in the majority of cases which have come under my observation, no such complication was present. Swelling, indeed, sometimes considerable, of the ovary commonly attends the process even of healthy ovulation; but this is not necessarily indicative of recent or old inflammation.

Sometimes ovarian dysmenorrhœa is the expression of some form of oophoritis, more especially of that form which Négrier called "vésiculite" or inflammation of the follicles. In other cases there is congestion, swelling, tension of the entire ovarian shell or capsule, producing a kind of strangulation more or less painful in the organ. In these cases the local symptoms are soon subdued or masked by various extraordinary nervous phenomena, usually designated as hysteria.

The work of ovulation, like that of pregnancy, excites, first, a higher degree of irritability of the cerebro-spinal centres; secondly, exalted tension of the vascular system; thirdly, if the investment of the ovary, or the follicle itself, present any obstacle to the free swelling and bursting of the follicle, or if there be any morbid condition, as subacute inflammation in the ovarian structure, then, ovulation being impeded, disordered, there is a source of irritation. These conditions combined will not unfrequently issue in the phenomena called "hysteria."

If the phenomena of dysmenorrhœa, that is, of the complex form in which there is difficult ovulation as well as difficult secretion and excretion, be observed and recorded with precision, it will, as a rule, be found that the so-called hysterical phenomena occur early. They coincide with the first part or stage of menstruation, that is, with the ovarian difficulty. They appear before the uterine or hæmorrhagic stage begins; and often subside when secretion and excretion are established. This history implies two things: first, hysterical phenomena find their source or their exciting cause in the ovary, not in the uterus; secondly, the ovary having discharged its function soon undergoes involution, returning to quiescence.

An objection, it must be said a superficial one, has been urged, that even the most severe and palpable diseases of the uterus and ovaries, such as cancer and ovarian dropsy, do not evoke marked nervous phenomena; and hence, by a false *à fortiori* argument, it is concluded that disorders of less severity cannot evoke them. It is quite true that diseases of the uterus, not only those which are severe, but also those which are comparatively slight, rarely of themselves call forth hysteria or other nervous disorders. During the ordinary state the uterus is a passive organ; it has no great sensibility. It may be cut, cauterized, and otherwise manipulated; it may be eaten away by malignant ulcerations, without producing severe nervous phenomena. During menstruation its sensibility awakens, and if the escape of the ovum be hindered, there will be increased and prolonged hyperæmia and hyperæsthesia of the uterus.

Difficult ovulation is almost always attended by increased afflux of blood, marked by increase of bulk of the ovary. The ovario-uterine vascular system is so entirely one, that increase of uterine afflux necessarily attends. It may therefore be expected that increased menstrual flow should be a consequence or symptom of difficult ovulation. Generally this is so. Menorrhagia is often the exponent of ovarian dysmenorrhœa. And whether menorrhagia be produced or not, some degree of pain referred to the uterus is often experienced. Thus we have combined the two forms or elements of dysmenorrhœa, the ovarian and the uterine. If we seek to analyze such cases, to resolve them into their component parts, we find no great difficulty. The ovarian distress almost invariably manifests itself first. Pain is complained of in one or other iliac or inguinal region, often for days before the flow appears, and before the uterine distress is felt. In many cases there is little or no uterine pain; and when the flow appears, the ovarian pain subsides. In the case of uterine dysmenorrhœa, the pain complained of is central, pelvic, and lumbo-sacral.

In connexion with ovarian dysmenorrhœa I may cite some views of Négrier which he deduces from striking clinical observations. He describes what he calls the "ovarian temperament." It depends upon large size and energy of the ovaries disposing to early menstruation, to profuse menstruation, to the persistence of the function to a late period of life, and to excessive sexual passion. He finds evidence of this ovarian predominance in the hyperæsthetic temperament; in the persistence of menstruation during the early months of pregnancy; in the quick return of the function after childbirth; and in dysmenorrhœa, characterized by a sudden attack of acute pain in an iliac fossa, confined to a space which may be covered by the palm of the hand. This pain is not in paroxysms, but permanent; it does not resemble intestinal colic, but more that of nephritis. There is no acceleration of pulse. These phenomena recur at every ovarian rupture.

Iliac pain has long been recognized as a frequent attendant on hysteria. There is some divergence of opinion as to the actual seat of this pain. Schutzenberger, Piorry, Négrier, and Romberg insist that it lies in the ovary. Briquet says it is only a muscular pain, a "myodome." The pain of the pyramidal portion of the inferior extremity of the rectus muscle has been mistaken for a uterine pain; and the pain of the lower portion of the oblique muscle answers to the pretended ovarian pain. Such is Briquet's opinion. That muscular pain often enters as an element in these cases, I do not doubt, but that this explains the whole case appears to me untenable. Sometimes the pain is very intense; the patient cannot bear to be touched by the bed-clothes. It is obvious that in these cases the muscles and skin play a part. There is general hyperæsthesia. But in many of these cases, emotion plays a part too; the patient shrinks and cries out before she is touched; and this shrinking, and this superficial pain are commonly only indications of an instinctive effort to protect the deeper structures, really the seat of pain, from injury. This is only one illustration of a general law, that suffering internal organs are protected by the muscles over them contracting in such a manner as to screen them from outward disturbance.

At other times, however, the pain in the iliac region is not complained of spontaneously, and there is little or no superficial muscular pain. The muscles, when relaxed, may be pinched without evoking pain. We must feel deeper. The pain is nearly fixed in one spot, that spot being the seat of the ovary. Pressure here will, as Charcot says, when brought to bear upon the ovary, cause a characteristic pain, inducing painful radiations towards the epigastrium, complicated sometimes with nausea and vomiting; next, if pressure be continued, palpitation, with extreme frequency of pulse, soon follows; and lastly, the sensation of globus hystericus is developed in the neck. Charcot goes on to say that various cephalic phenomena succeed; such, for instance, as when the left ovary is compressed, intense wheezing noises in the left ear, and loss of sight of the left eye. If the right ovary be compressed, the head-symptoms are noticed on the right side. If pressure be pushed beyond this point, convulsions would break out.

The following case related by Négrier is so apposite as a typical illustration, that I cite it in detail.

A lady, aged twenty-one, of ovarian temperament, had hysteria from fourteen to eighteen; married at nineteen; had abortion at fifth month of pregnancy, after riding on horseback at a menstrual epoch; free hæmorrhage two months later. Suddenly violent muscular contractions, with throwing back of the spine set in; sharp involuntary cries, suffocating sensations attended. Energetic *pelvic projection* as often as the hand is applied to the hypogastrium. She had not menstruated since abortion. Pressure in the right iliac region reproduced a nervous irradiation towards the diaphragm. This sensation, said the patient, was exactly like that which precedes the nervous attacks. She recovered after dry cupping and cupping blood in the iliac fossa.

The "pelvic projection" mentioned by Négrier, consists in the throwing forward of the pelvis. It is a frequent and remarkable symptom of oophoria.

In several cases Charcot demonstrated that the convulsions of hysteria could be controlled, resolved by firm pressure upon the ovary. Willis, it appears, in the seventeenth century, was aware of the power of firm pressure by the two hands in the abdomen in stopping a fit of convulsions.

Charcot says he knows a young person in whom an hysterical fit can be produced by compression of the left ovary; and Dr. Tilt says he knows a patient in whom similar pressure is followed by unconsciousness. I have myself on several occasions witnessed similar sequences of nervous phenomena.

I feel a strong conviction that close observation will tend more and more to establish the fact, that iliac pain is the most constant and the primary feature in hysterical attacks. Opponents of the ovarian theory have too much insisted upon what seemed to them the unanswerable fact, that there is no relation between hysteria and indubitable disease of the ovary. It is true that severe organic disease of the ovary is not often attended by hysteria. It is even probable, that since severe disease commonly tends to suppress the function of ovulation, it would thereby tend to suppress hysteria. It is not organic disease of the ovary that causes hysteria, but that disorder, that difficulty in the performance of its function, which is so common in young persons.

Perfect coincidence as to time in the occurrence of ootocia, and of the development of hysterical symptoms, is not wanted to establish the truth of the ovarian theory. Clinical observation, however, proves conclusively that the iliac pain, which is the expression of dysootocia, in an immense number of instances, is the first condition. When once the hysterical temperament has been thoroughly established by several attacks, the excitability of the nervous centres induced is so great, that it will respond to the slightest peripheral or emotional irritation. The attacks then occur at other than the menstrual periods. It must, moreover, be remembered that menstruation, that is, the flow of blood, does not alway coincide exactly with ootocia. This process certainly often begins several days before the uterus pours forth blood; and in very susceptible persons, the proclivity to excito-motory disturbance is so great, that even the trouble of the early stages of dysootocia is enough to bring forth the hysterical fit.

When the hysterical habit has once gained force, any physical or mental fatigue, or ordinary emotion, may induce such exhaustion of the nerve-force that the balance is disturbed, and the control of the will, which undoubtedly is often sufficient to keep down a fit, is lost. It is, however, a serious error, because, if acted upon, it may lead to cruel treatment, to look upon hysteria, as some do, as essentially a mental disorder characterized by moral perversion. Some such element certainly, in some instances, enters into the field; and a certain degree of counteracting moral force from without must be exerted in the treatment. But intimate knowledge of the constitution and character of many sufferers from hysteria leaves a settled conviction on my mind, that the attack is utterly beyond their voluntary control; that they look upon it with a sense of pain and degradation; that they would willingly conceal their infirmity from others. In persons of feeble character, of little self-reliance, eager for sympathy, especially where the ovarian excitement gives rise to an erotic feeling, no doubt the attack is often promoted and encouraged by a perverted will. It is difficult when witnessing a case of this kind to repress the feeling that a decided treatment of coercion would be the most appropriate. But it would be neither true in science, nor morally justifiable, to carry this feeling into the treatment of the numerous other cases in which the patient can no more suppress her illness than can the subject of puerperal convulsions. Lately it has been proposed to employ terror—the terror of being strangled by violent compression of the vessels of the neck—as a means of dealing with these cases. I cannot look upon this revolting practice—for I believe it has been practised—without shame and humiliation that such ignorance and brutality should be so far recognized as to be discussed.

Tracing the nervous phenomena usually summed up as "hysteria" to ovarian influences, Négrier proposes to substitute the word "ovarie" for "hystérie." Agreeing in great measure with Négrier's views, I see practical objection to the particular word he has selected. I therefore propose the word "oophoria," which is more correct etymologically, and convenient in relation to oophoritis or inflammation of the ovary.

Négrier says the ovaries perform alternately.

1. He finds in one ovary a recently ruptured follicle, and in the opposite, one coming forward.

2. In cases of dysmenorrhœa the suffering is sometimes at every other epoch, the pain being one-sided, and in that side which at other times has evinced local disease.

3. In women having double uterus and vagina, the menses have come from each side alternately.

The *diagnosis* of ovarian dysmenorrhœa is made out by the history, the subjective signs, and the objective signs. Pain occurs in one or both iliac regions, limited to a small space, before the menstrual flow appears; if the region which is the seat of pain be touched externally, the abdominal muscles become tense, so as to screen the deep structures beneath; if pressure be made on the opposite side, although often the patient shrinks, either from dread or from a generally diffused hyperæsthesia, the pressure is borne with comparative ease; if examination be made by the vagina very tenderly, so as to touch the os uteri without exerting pressure on either side of the uterus, no marked pain is elicited; but if the uterus be pressed upwards or towards the side where the affected organ is situated, acute pain is produced; if the finger be pressed deeply in the vaginal roof towards the affected ovary, avoiding the uterus, pain is also elicited; if the abdominal muscles can be relaxed, and sometimes an opportunity is found on deep expiration with the thighs well flexed, the hand outside can be pressed down towards the finger inside, so as to grasp the tender ovary between them; if the like manœuvre be repeated with one finger in the rectum, the ovary may often be felt enlarged, tumid, tender, a little lower than its usual position, and a little more central.

There is another sign characteristic of ovarian congestion which I have almost constantly observed. It is this: the body of the uterus is drawn towards the affected ovary in lateriversion, so that the vaginal roof on that side is more tense and full than on the other. This drawing together of the uterus and affected ovary is no doubt due to the greater tumefaction of the intervening tissues, caused by the more active vascular process.

It is curious to remember that Galen says lateral displacement of the womb is often associated with hysteria.

A frequent, if not constant, phenomenon in ovarian dysmenorrhœa is a swelling of the lower abdomen, which takes place about the time of the menstrual effort. It is due to distension of the intestines, and is the result of a disturbance or metastasis of nerve-force, by which the intestines for a time lose their tone or contractile energy.

The symptoms above described will, in many cases, be found almost alone, that is, as far as pelvic symptoms are concerned. They will in almost every case be attended with nervous phenomena, generally of the so-called hysterical order, sometimes by vomiting, occasionally even by convulsions, generally by headache. The pulse is seldom much accelerated; there is no marked heat of skin.

But in a considerable number of cases the symptoms of ovarian distress are accompanied by those of uterine distress. Uterine-obstructive dysmenorrhœa, as it is commonly called, but to which I prefer the term, dysmenorrhœa from retention, complicates the ovarian dysmenorrhœa. But even in these cases the ovarian symptoms take precedence in time.

The *treatment* of ovarian dysmenorrhœa.

The indications are, to allay general and centric hyperæsthesia, and to moderate the local ovarian pain. The two indications are carried out at the same time. It is important to clear out the bowels, so as to take off any pressure upon the ovaries which a loaded rectum may cause. When the pain is very great, and especially if the pulse rise, and the skin be hot, ten or twelve leeches to the iliac region will give great relief. Two or three leeches applied directly to the fundus of the vagina are more effectual; but this treatment is open to serious practical objections. Indeed, when we consider that the affection is one that tends to return every month, the remedy may be found as distressing as the disease; and if often repeated, the consequent anæmia and debility will increase the hyperæsthesia by lowering the general strength. Now and then, however, the affection has been cured in a comparatively short time by the application of leeches outside. Fomentations, to which turpentine is added, or slight vesications by chloroform, may always be used with advantage. Warm water enemata, acting like fomentations, will sometimes give relief. Their efficacy may be increased by adding a drachm of laudanum to the water used.

The general remedies consist chiefly in sedatives. Hoffman's anodyne, acetate of ammonia, chloride of ammonium, bromide of potassium, chloral hydrate, and opiates give valuable aid. Opiate suppositories, or vaginal pessaries, are often serviceable. If convulsions appear, the inhalation of chloroform should be resorted to, with great discretion, however, lest we engender a desire for its frequent use. Here, again, as generally in the diseases of women characterized by marked nervous phenomena, alcoholic stimulants should be allowed only in the most rigorous moderation, or even absolutely cut off.

DYSMENORRHŒA FROM OBSTRUCTION OF FALLOPIAN TUBES.

Bernutz relates a case which seemed to be of this nature. A lady at twenty-eight enjoyed good health till some months before death; she then had metrorrhagia, and was thought to have a miscarriage. During a time of severe mental trial she was seized suddenly with violent pains in the abdomen, fainting, and vomiting. There was then no discharge. She soon sank with symptoms of internal hæmorrhage. Much blood was found in the abdomen and pelvis. The left tube presented a tumour the size of a pigeon's egg; on its surface was a small transparent cyst, covered with filaments of the tube. At its junction with the uterus the tube was rendered impervious by a small fibrous tumour.

INFLAMMATORY DYSMENORRHŒA: DYSMENORRHŒA MEMBRANACEA; (ENDOMETRITIS EXFOLIATIVA)

Inflammatory dysmenorrhœa is not common in single women. The clearest examples are those in which dysmenorrhœa follows on suppressed menstruation, as from the sudden shock of cold, injury, or emotion sustained during the flow. Under this circumstance, metritis, or at least intense uterine congestion, is very likely to arise; and an inflamed organ necessarily performs its function, if it be performed, with pain. Not uncommonly in these cases, pelvic peritonitis and oophoritis complicate the metritis; and these conditions in themselves will make menstruation painful. The history of the case, the evidence of primary pelvic inflammation, and of secondary dysmenorrhœa, explain the nature of the affection. In some of these cases there is not only some degree of chronic metritis persisting, but as sequelæ of the peritonitis, adhesions may remain which impede the mobility of the uterus, and even drag it out of place. Local examination confirms the diagnosis supplied by the history.

In these cases the appropriate *treatment* is to apply six to ten leeches to the groin, or two to the cervix uteri; or to scarify the vaginal-portion; to use warm hip-baths containing Vichy salts; to administer salines and sedatives. If the peritonitic complication be severe, it is desirable to give small doses of calomel and opium for two or three days. The rectum should be cleared out by an enema of gruel and olive oil; but all purgatives which disturb parts which ought to be at rest, should be carefully avoided.

Inflammatory dysmenorrhœa is well exemplified, although not perhaps in its purest form, in those cases where metritis, with perimetritis and some degree of fixing of the uterus, spring up, and persist after labour or abortion. In many of these cases there is a clear history of freedom from dysmenorrhœa until after labour; henceforth the menstrual function is performed with pain. The pain comes on with the flow, which is often profuse, lasting for six days or more. The pain is referred to the uterus, whence it radiates to the back. The treatment resolves itself into that of the abnormal condition of the uterus, and surrounding structures. The further history, then, of this form of dysmenorrhœa will be discussed when describing the conditions of which it is a symptom or consequence.

The *Dysmenorrhœa membranacea* may be classed under the inflammatory kinds. It is often a very obstinate affection. The pathognomonic feature is the discharge of a membrane, sometimes in shreds, sometimes representing a cast of the cavity of the body of the uterus. Denman seems to have anticipated one of the most commonly accepted theories of the dysmenorrhœal membrane. He says*:—"Having very often observed a substance expelled with the menstrual discharge, which has hitherto escaped notice, and apprehending that the knowledge of this substance may be of use in practice, I feel it incumbent on me to describe it. . . . . I constantly found that one surface had a flocky appearance, and the other a smooth one; that it had in all respects the resemblance of that membrane, which Ruysch had called the villous, of the formation of which Harvey has given a very curious description, which the late Dr. Hunter described with his usual precision, and called the decidua. To put the matter out of doubt, I requested the favour of Dr. Baillie to examine some portions of this membrane, and he agreed with me in thinking it an organized membrane similar in structure to the decidua. As the first cases in which this membrane was discharged were those of women who were married, a doubt arose in my mind whether it was not really a consequence of early conception; but I have lately had the most undoubted proofs that it is sometimes discharged by unmarried women, and may be formed previous to and without connubial communication." A case is graphically related by Morgagni. These membranes have often been regarded as casts formed by exudations of lymph, like those of croup. They are so described by Montgomery, R. Ferguson, Churchill. But Oldham* distinctly enunciated the proposition that they were formed under the ovarian stimulus; and that they were formed by the uterine glands—that they were, in short, menstrual decidua.

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* "Introduction to the Practice of Midwifery."

Oldham's observation was speedily confirmed by others. Professor Simpson† described the membrane as resembling the decidua vera. Bernutz cites three cases from Boivin and Dugès, in which casts or cysts were expelled from the uterus, in order to prove that the affection described by Oldham had been previously known in France.

But here, as is constantly happening in the history of medicine, we have an instance of the disposition, at once and absolutely to exclude the hitherto existing theory of a disease, and to replace it as absolutely by the last new theory brought forward. It is too often forgotten that both may be true, as expressing the nature of certain cases; and that neither may be true, as expressing the character of all cases. The new fact, that the membrane expelled is the mucous membrane of the uterine cavity, is undoutedly true, but I am in a position to affirm from my own observation that the membrane expelled in some cases of dysmenorrhœa consists essentially of fibrin and mucus, and does not contain the elements of mucous membrane.

It is important then to bear in mind that the *membranes associated with dysmenorrhœa are not all of one kind.*

The *first kind* may be defined as the exfoliated mucous membrane of the uterus. All the elements of this membrane may be recognized by the microscope. When voided they may be entire, in which case their source and nature are easily recognized. They are then seen as three-cornered bags, somewhat longer in one direction, having an irregular opening at each angle, the opening at the smaller end or space being larger than the two others. This lower opening corresponds with the os internum uteri, the other two with the ostia of the Fallopian tubes. The membranes are rough, ragged on the outer surface, and smooth on the inside. In size they are about an inch and a half long, and a little less in width, that is, generally somewhat in excess of the normal proportions of the cavity of the body of the uterus. Under the microscope, the distinctive element of the uterine mucous membrane, namely the utricular glands, is made manifest. It may be said that the identification of this membrane as mucous membrane was a natural consequence of the identification of the decidua of pregnancy as mucous membrane. This decidua had already gone through the same phases of theory, that is, it was long looked upon as a simple exudation from the inner uterine surface, analogous to the fibrinous effusions of inflammation or croup, and it was ultimately recognized as the highly developed mucous membrane. The application of this knowledge of the true nature of the *decidua gravida* to the study of the deciduous membrane of dysmenorrhœa, might be directly suggested by the demonstration of Coste that the uterine mucous membrane at the epoch of menstruation assumed a development strictly analogous to that which it assumed on the advent of gestation. This similarity suggested to Virchow the name "*decidua menstrualis*" for the dysmenorrhœal membrane; and this name, although rather

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* "London Medical Gazette," April 17th, 1846.

† "Edinb. Monthly Journ. of Med. Sc.," Sept. 1846.

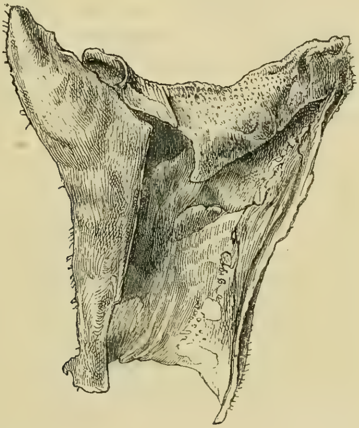

Fig. 70.—(St. Thomas's Museum, G. G. 4, nat. size.)

UTERINE MUCOUS MEMBRANE SHED ENTIRE, LAID OPEN, SHOWING INTERIOR CAVITY SMOOTH (R.B.). At upper part are seen numerous points, the openings of glands; on the outer surface are slight ragged projections.

indicative of a constant or normal state, than of a pathological one, it is convenient to retain. The decidua menstrualis, then, may be expected to present characters like those of the decidua of early pregnancy. And this similarity is so close that some observers have impugned the existence of the decidua menstrualis, and contend that all membranes presenting the characters of decidua are really the product of conception; that, in short, the so-called dysmenorrhœal membrane is nothing but the issue of an early abortion. This view was distinctly enunciated by Dr. Hausmann,* who based his conclusions on the examination of specimens furnished by Martin and Virchow. The discharge of the membrane at the menstrual epoch is not, he says, constant; it is often a few days in arrear; the expulsion begins, as a rule, from six to twenty-four hours, sometimes several days, after the beginning of hæmorrhage, and always under forcing pains. The several causes of this abortion and of the consequent expulsion of the decidua, are not yet known, but probably the premature destruction of the embryo is the first factor. Hausmann cites, amongst other arguments, a case from Tyler Smith, which if it be admitted as typical, would indeed furnish strong evidence in favour of the abortion-theory. A woman whilst single was healthy; from the time of marriage to death of her first husband she passed membranes at irregular intervals; became free whilst a widow; and again discharged these membranes six months after a second marriage.

To accept this theory, that the menstrual decidua is simply an abortion, may be to subject the patient to an impeachment of her character. If the membrane be the result of sexual intercourse, the discharge of one by a single woman, or by one living apart from her husband, must be taken as proof of unchastity. Subsequent observations confirm the statement of Denman that dysmenorrhœal membranes have been observed where the absence of sexual relations was undoubted. Some of the membranes are fibrinous casts or blood-clots which, compressed in the uterine cavity, have lost more or less of the red-globules; and on the surface, especially, have assumed a pale and membranous appearance. Generally, however, these altered blood-masses are more or less solid; that is, they present no cavity, or if there be one, it is filled with blood, fluid or coagulated. These casts or clot-moles are not very uncommon accompaniments of dysmenorrhœa. There is no doubt of their being shed independently of impregnation, or even of sexual connexion. But they are certainly more common in women who have had children, and who continue to be subject to sexual connexion. The natural monthly shedding of the uterine mucous membrane, instead of taking place, as in the usual way, by disintegration, so that the elements escape gradually as detritus, mingled with the menstrual blood, may be effected by a more rapid and violent process. In this case we shall find distinct shreds, perhaps an entire cast, composed of fibrinous fibrillæ, of fibre-cells, numerous mucous-globules, and epithelium-cells. In the case from which the figure (Fig. 70) is taken, the subject had had children, and suffered severely from menorrhagia and dysmenorrhœa.

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* "Monatsschrift für Geburtskunde," 1868.

It is quite conceivable that the uterine mucous membrane, having undergone an unusually full menstrual development, may be cast off even more completely than in the preceding case. We should then have the typical contested decidua menstrualis. The inner side would exhibit the fine points or holes of the orifices of the utricular glands, and the outer side, the ragged flocculent appearance which is commonly, but not always, seen in early aborted ova. It does not consist of the entire mucous membrane of the uterus. The outer layer of the mucous membrane, with the blind extremities of the uterine glands, remains behind. The decidual membrane contains the normal elements of the mucous membrane, the ciliated epithelium, the glands, the vessels and connective tissue; the vessels and connective tissue are hypertrophied; the glands are elongated and widened. It being admitted, that the mucous membrane, under simple ovarian menstrual excitation, undergoes a high degree of development not distinguishable from the decidua of early pregnancy, it must also be admitted as possible that the mucous membrane so developed may be cast off. Moreover, that the presence of an ovum in the uterus is not necessary for the development of a membrane having all the characters of the decidua of pregnancy, is proved by the formation of a decidua *in utero* in cases of tubal gestation.

Rokitansky distinctly says, when describing the characters of a membrane submitted to him by Mandl, "The development of the mucous membrane is in excess of its usual menstrual degree. It is not, however, connected with conception." It does, however, occur in women who have had children. Courty relates in full a case of a girl who passed membranes at her periods. On one occasion he extracted one from the os uteri by forceps, through a small speculum carefully manipulated, so as not to break down a virginal hymen. John Williams relates (*Obstetr. Trans.* 1877) several. I myself have seen others. Denman has an interesting remark. "This is not," he says, "the only circumstance in which some women, at each period of menstruation, have symptoms like those which accompany pregnancy or parturition."

Another form of cast appears to consist purely of fibrin. These come in shreds, or in one piece representing the shape of the uterine cavity. Under the microscope, nothing but the fibrillar arrangement of fibrin, interspersed with mucous corpuscles, is seen. Indeed in almost every instance, products of inflammation of catarrhal character will be found. Stenosis of the os externum, which as we have seen is so sure a cause of dysmenorrhœa and of uterine catarrh, is a frequent condition. In some cases of endometritis it would seem either that a layer of fibrin may be effused, or that the mucous secretion, rendered more tenacious by retention and by fibrinous matter, may form a distinct layer on the surface of the mucous membrane. Such a membrane may be independent of impregnation, but being associated with chronic metritis, it is most frequently seen in women subject to sexual connexion. At the menstrual epoch the chronic metritis is intensified, and may deserve the name given to it by H. Huchard* of "*menstrual metritis.*" I have seen it in virgins.

In some cases the *albuminoid secretion from the cervix uteri*, which is especially copious in endocervicitis, may, entangling a lesser proportion of epithelium, produce a tenacious membrane less solid than the preceding, but of a similar character. This may occur in single as well as in married women. The mucous plasma thus condensed, assumes very much the appearance of fibrillæ.

Shreds of membrane, mostly very small, are frequently passed when there is *malignant disease* of the uterus. These are the result of superficial disintegration or necrosis of the diseased structures. They are not likely to be mistaken for dysmenorrhœal membranes. They differ in being mostly minute in size, and in being attended by the turbid, greenish, watery discharges, characteristic of cancer. I have seen shreds of this kind brought away from the interior of the uterus by the small sponge-probang when the disease affects the cavity.

In some cases I have been satisfied that the unhealthy condition of the uterine mucous membrane leading to the casting of shreds and membranes was due to *syphilitic disease.* Inquiry in this direction by examining the skin and the state of the mucous membranes elsewhere, as well as by weighing the history of the patient, is important. A succession of early abortions or dead children affords highly presumptive evidence.

Raciborski points out † that the mucous membrane of dysmenorrhœa may be distinguished from the decidua of early abortion. The dysmenorrhœal membrane is generally in shreds, thin and membranous, triangular, and showing the orifices of the tubes and os internum uteri. It is always expelled at a menstrual epoch. On the other hand, the aborted decidua is generally thicker, blood being extravasated in the substance; in shape it is more ovoid; the tubal orifices are not easily made out; and it is generally passed after a period has been suspended. But these characters are insufficient. The only safe evidence of *decidua gravida* is the recognition of chorion-villi.

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* "Gazette des Hôpitaux," 1870.

† "Traité de la Menstruation."

Shreds of a membranous appearance may be passed from the *vagina* at inter-menstrual periods, which do not necessarily come from the uterine cavity. Thus the ordinary exfoliation of epithelium which takes place from the os uteri may, under a condition of sub-acute inflammation, be so rapid, that the throwing off of epithelium-cells exceeds the proportion of mucus necessary to maintain fluidity. In such a case there is formed a layer of whitish material which covers the mucous membrane, resembling a diphtheritic membrane. This consists almost entirely of pavement epithelium-cells and mucous globules. I have not seen this in virgins, but the possibility of its occurrence cannot be excluded.

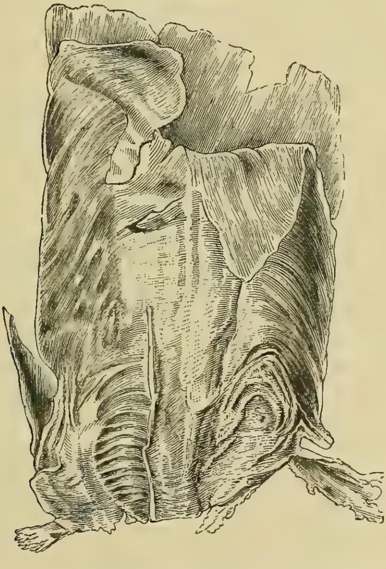

Fig. 71.—(Cast in St. Thomas's Museum—ad. nat.)

EXFOLIATED MUCOUS MEMBRANE OF THE VAGINA (R. B.).

Under peculiar puerperal states also, the vulva, vagina, and perhaps the uterus, may be covered with a diphtheritic membrane, closely resembling that which covers the fauces in diphtheria.

I mention one circumstance, to warn against a possible fallacy. When women suffering from leucorrhœa are using astringent injections, as of zinc or alum, the albuminoid mucus is coagulated by the injection, and comes away in shreds. The patients say it brings away "bits of flesh or skin."

Dr. Arthur Farre has described* cases in which complete casts of the vagina were passed. These were distinguished from uterine membranes by their having the exact form of the vagina, by the absence of the characters of the uterine mucous membrane, and by not being cast under symptoms of dysmenorrhœa. The drawing, Fig. 71, is taken from a specimen of this kind in St. Thomas's Museum.

It should be borne in mind also that the superficial layer of the vaginal mucous membrane is liable to be exfoliated under the application of perchloride of iron. Thus, I possess a very complete cast of the vagina, showing all the rugæ, which was shed after several intra-uterine injections of this styptic to arrest obstinate metrorrhagia. This membrane, like other compressible substances in the vagina, was not expelled, but got rolled up in a ball in the posterior vaginal cul-de-sac, whence it was brought away by the finger. It escaped detection by the speculum. The surface of the vagina and os uteri was pale, and very smooth. A single injection is not likely to cause this exfoliation, unless it be used of nearly concentrated strength.

The disposition to cast membranes must not be regarded from too special a point of view. I have known cases where membranes were shed from the bladder, there being other evidence of cystitis; and from the bowel as well as from the uterus. We must look beyond the uterus for more general causes. And even in the more strictly uterine cases, we cannot overlook the peculiar state of the nervous and vascular systems preceding and attending menstruation. The exalted tension, nervous and vascular, at this time excited into pathological extremes by the obstruction to the menstrual function, becomes an important factor, and gives indications in treatment.

Nor must we in this connexion omit reference to the part which the altered constitution of the blood attending menstruation may play. As in pregnancy, the blood is more fibrinous; and under the special complication of dysmenorrhœa, general and local conditions still more approaching to those of pregnancy are induced. It is not therefore surprising that under the combined influence of these conditions mucous casts should be more common.

Dr. Andrew Clark (*Pathological Trans.*, 1858), Dr. Perroud (*Journ. de Méd. de Lyon*, 1864), Mr. Walter Whitehead (*Notes on Mucus Disease*, 1870) have studied the history of membranous exfoliations from the intestine with great care. The membranes formed in the intestine are cast with similar pain, and the expulsion seems critical, followed by some relief. They recur in many cases periodically. They occur most frequently in women. Of one hundred cases, four only occurred in males. This evidence of the liability of the mucous membranes generally to a similar affection, suggests an analogy with the eruptive, or exfoliative affections of the skin, affections which undoubtedly often depend more upon constitutional than upon local conditions. In this connexion it is useful to recall attention to the history of the mucous membranes in scarlatina, typhoid, and other fevers. I have already referred when describing "Leucorrhœa" to the occasional origin of this affection during scarlatina and small-pox.

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* Beale's "Archives"

The Symptoms.—The presence of inflammation as a necessary element has been doubted. But there can be no doubt as to the general presence of congestion and hyperplasia. It may be doubted whether a single case has occurred in which some morbid condition of the uterus has not been developed. There is almost always extreme tenderness of the uterus on touching the vaginal-portion or the body of the organ; and increased bulk of the uterus is discovered by combined intra-vaginal and abdominal palpation. Dyspareunia and sterility are almost constant complications. The tendency to rapid morbid hyperplasia of the uterine mucous membrane seems to unfit this structure for the formation of healthy gravid decidua, while the congestion and irritability of the muscular wall dispose the uterus to premature contraction, and to cast off its contents.

The process of detachment of the morbid mucous membrane is violent, and not the slow result of gradual exfoliation. Exudation of fluid, serum, sometimes blood, takes place between the inner uterine wall and the layer of mucous membrane which is to be thrown off; then spasmodic contractions or colics of the uterus being set up, the detachment and expulsion are completed. Williams found in a case examined after death, the exfoliation beginning from the os uteri internum, and thence extending to the fundus uteri. He confirms the proposition stated above that there is hyperplasia or fibrosis of the uterine wall.

The symptoms are in harmony with this view. Pain, pelvic abdominal and inguinal, precedes the menstrual flow by several days. There is bearing-down pain, with sense of increased fulness and weight in the rectum, frequently causing tenesmus both of the rectum and of the bladder. Pain in one or other ovarian region, more commonly the left, is very frequent. A painful sensation of gnawing, extending to the umbilicus and epigastric region, has been complained of in several cases. The pain is intensified, assuming an expulsive labour-like character when the flow sets in, and is so continued from twenty-four to forty-eight hours, when the membrane is usually expelled. The pain then abates; but frequently the discharge of blood is profuse, and lasts for some days longer. When this has ceased the patient rallies for a time, to be again cast down by the recurrence of a similar train of events. It is not, however, every menstrual period which is attended by the expulsion of casts. Sometimes a period, marked by less severe pain and less hæmorrhage, occurs. Sometimes the membranes are passed on alternate months. It deserves to be carefully observed how far these intermissions correspond with the suspension of sexual intercourse. I have observed several cases in which a succession of casts, of the fibrinous variety, three or four in a series, have been expelled within one menstrual process. Dr. Rigby says oophoritis is not seldom the result or concomitant of this form of dysmenorrhœa; and this association with ovarian stimulation deserves further attention. It is not improbable that in many instances the primary factor is in the ovary. According to the degree of nervous susceptibility and general impairment of health of the individual, various degrees and forms of hysterical and other nervous derangements will manifest themselves. Pain is not constant. I have notes of one case in which most complete casts were passed regularly for many months, very little or no pain being complained of. When they ceased the uterus was distinctly smaller. The patient recovered.

The *treatment* of dysmenorrhœa membranacea will of course be greatly governed by the view we take of the pathology of the affection. If we conclude that an essential factor is sexual intercourse, especially if involving impregnation, the main treatment is obviously prophylactic. Abstinence, that is, physiological rest for a time, should be dictated. We then gain time and opportunity for treating the morbid conditions of the system and of the generative organs.

The survey we have taken of the affection almost precludes the idea that the menstrual membranes are cast by the healthy uterus. It follows that we must carefully study the physical condition of the uterus, and direct treatment to the removal of the complicating diseases.

What are the best local applications? It is clear that the origin of the membranes being the lining membrane of the cavity of the uterus, our remedies must be applied there. We can only act very slowly indeed, if at all, if we trust to the principle of derivation by limiting the application of remedies to the cervix. It is of the first importance to begin by well dilating the cervix, so as to get free access to the cavity of the uterus. In some cases where the disease has been associated with a narrow os externum, the division of this orifice has been followed by relief. If there is a syphilitic taint I would advise the mercurial vapour-bath, using a bath-speculum to enable the vapour to enter the vagina. To the inner cavity of the uterus we may apply nitrate of silver, iodine, bromine, or sulphate of zinc. The iodide of mercury may be applied in the form of ointment by my instrument. (See Fig. 52, p. 164.) The application should be repeated every five or six days.

Mandl speaks favourably of chlorate of potash, as this remedy is known to possess a decided influence on the liquefaction, degeneration, and resorption of epithelial growths and pseudomembranous exudations of the mucous membrane. In the case he narrates, benefit attended the use of this substance. If nitrate of silver be used, it should be reduced by using three-grain sticks, made by fusing together equal proportions of nitrate of silver and nitrate of potash. Fuming nitric acid is sometimes effective. If there be retroversion or retroflexion, as is not uncommon, this must be corrected.

When there is considerable turgidity of the cervix, from congestion or active inflammation, two or three leeches applied to the cervix uteri, or scarifying the vaginal-portion, may be useful.

Constitutional treatment, hygienic, and including the exhibition of remedies by the stomach or skin, is often essential. Digitalis, bromides, salicylic acid, and other agents that lower nervous and vascular tension, should be tried during the stage preceding menstruation.

The severe suffering attending the dysmenorrhœal paroxysms may be mitigated by opium, Hoffmann's anodyne, chloroform, chloral, Indian hemp, bromide of potassium, or ammonium, or other sedatives. The liquor ammoniæ acetatis is valuable by itself, and is the best menstruum for opium. Trousseau recommended turpentine, in twenty-drop doses, continued for three months, and the prolonged use of warm baths. C. Braun prescribed small doses of arsenic, to allay the attendant painful excitement. Hot water injections or hot baths are often useful.

Tonics, as iron, quinine, strychnine, arsenic, and the mineral acids are almost always serviceable, as adjuvants to local treatment.

The bowels require special care, as accumulation in the rectum is a serious aggravation of all uterine affections.

Prognosis.—With all possible care we must be prepared to find these cases rebellious to treatment for a long time ; sterility may be regarded as a consequence ; for when pregnancy occurs, and is carried on for some months, the disease may be considered to be cured. But it may return after labour.

CHAPTER IX.

THE MENSTRUAL IRREGULARITIES OF THE CLIMACTERIC EPOCH.

In connexion with the deviations from healthy menstruation, it is convenient to trace the history of menstruation at the climacteric epoch. This epoch is sometimes called the "menopause," to indicate the cessation of the function of menstruation. There is no fixed uniform period for this event. Some women cease to menstruate at forty; others go on till fifty or even later. In some the transition is, if not abrupt, at any rate well marked; in others the transition is protracted, interrupted by occasional suspensions, or the missing of a period or two. The flow becomes irregular both as to periodicity and quantity. This uncertainty has earned for the climacteric age the expressive term of "the dodging time of life;" often it is called "the change;" "*l'âge de retour;*" and a great deal is implied in these expressions. The transition-period, from active ovario-uterine life to the stage of sexual decrepitude or degeneration, is seldom effected without some disturbance; and in many cases the local and constitutional disorders that attend it are numerous and severe.

Physicians do, indeed, talk of the climacteric in man; but the analogy is more fanciful than real. In the male sex there is no epochal limitation of sexual life. There is nothing to compare with the almost sudden decay of the organs of reproduction which marks the middle age of woman. Whilst these organs are in vigour, the whole economy of woman is subject to them. Ovulation and menstruation, gestation and lactation by turns absorb and govern almost all the energies of her system. The loss of these functions entails a complete revolution. And before the new *régime* is established, an interregnum of trouble has commonly to be passed through.

For thirty-five years or more, the pelvic organs have been the seat of active periodical congestions, and determinations of nerve-force. When ovulation ceases, this nerve-force and local activity of the circulation are suddenly called upon to find other outlets. The transition frequently entails symptoms that partake of a pathological character. These symptoms are chiefly referred to the nervous system, to digestion, and to the circulation. Menstruation, instead of ceasing gradually, not seldom assumes the form of hæmorrhages, more or less periodical. These are sometimes the result of abortions.

The last effort of menstrual life is to propagate. The ovaries retain their function of maturing ova perhaps a little longer than the uterus retains its capacity for gestation. As in the outset of menstruation so in the cessation, the uterus may be found unfit: in the first case it is immature; in the second, there is commencing atrophy. Generally, however, atrophy of the uterus follows that of the ovaries.

To a certain extent the healthily acting ovaries and uterus exert a protective influence; the decadence of the generative organs is attended by increased proneness to the development of organic diseases, especially cancer. We may conjecture that the ovaries and uterus no longer exercising their normal functions and authority, morbid diatheses or organic defects hitherto latent or suppressed, break out, and absorb the remaining energies. Thus in another sense we discover that the menopause is a "critical" or testing event.

When hæmorrhages do not occur, or are not substituted by vicarious discharges, as hæmorrhoids, epistaxis, or leucorrhœa, severe headaches and cerebral congestions are liable to take place. Vertigo, epilepsy, apoplexy, are more likely to happen. The headache is peculiar; it is chiefly occipital, involving the nucha and spinal cord; and invokes distressing mental phenomena. Minor moral, emotional, and intellectual aberrations arise. A desponding, gloomy state, verging upon hypochondriasis, is not uncommon. These are often controlled by a well-regulated will; but sometimes they break out. Fretfulness, irritability, forgetfulness, indecision, are the earlier signs. There is nothing so frequently complained of as the want of power of attention, and consequently of loss of memory. The nervous disorders which so often attend dysmenorrhœa and amenorrhœa, are reproduced at the climacteric age with exaggerated force. The subject of them is generally perfectly aware of her condition; she feels acutely the distress her waywardness occasions to others; and when she is unable to control it, she will seek to hide it in seclusion until it has passed away. This is often the explanation of conduct which, to the unobservant, appears motiveless or wilful. This power of comparison, of judgment, is, as Conolly insists, that which distinguishes sanity from insanity. It is a shallow saying that women can give no reason for what they do. They justly claim the privilege of weakness by declining to give one. They rather incur the reproach of being illogical or unreasonable, than wound their sense of delicacy. Woman's decision, then, is to be respected, not questioned.

Disorder of the Alimentary Function is one of the most common attendants upon the menopause. The habit of constipation has perhaps already been acquired. It becomes aggravated. It would seem that there is a metastasis of nerve-force to the intestines. They become the seat of severe spasms. This is due in some cases to loss of tension of the abdominal walls, the result of pregnancy; to loss of tonicity from defective nutrition attendant upon invalidism and want of exercise; to obstruction to the action of the bowels from pressure on the rectum, as from retroversion or prolapsus of the uterus. From these and other causes, especially from the tendency to adiposity, the intestinal canal, wanting its normal contractile property, becomes liable to distension from flatulence and the accumulation of fæcal matters. Hence irritation, exciting spasm and other irregular actions of the intestinal muscular walls. The distress arising from this source is often very great; and in many cases where the nervous centres are involved in the climacteric confusion, the sensations arising in the belly are misinterpreted, and are the immediate occasion of mental phenomena, verging upon, and not seldom passing into insane delusions. One of the most remarkable yet familiar illustrations of this condition, is the conviction entertained by the sufferer that her abdominal symptoms are due to pregnancy. In some cases there is enough evidence, *primâ facie*, to impose upon others, even upon the medical attendant. This state is known as "*False or Spurious Pregnancy*," a term which has been Hellenized by Mason Good into "*Pseudocyesis*." It is sufficiently marked to merit special attention. Although arising chiefly at the climacteric period, there is hardly any limit to the age at which these symptoms, and the subjective belief in pregnancy, may occur. Thus, I have seen several examples of women long past sixty, whom it was difficult or impossible to convince that they were not pregnant. Some of these were married, some were single. In the latter case there had been a clandestine intercourse. The mental perturbation consequent upon the sense of error, and the dread of exposure, rendered more vivid the perception of the local phenomena, and completely overthrew the mental faculty by which they were judged. We easily believe what we wish or fear to be true. So strong is the delusion in some cases, that no amount of reasoning or authoritative decision will dispel it. I have dealt with them in this way. I have got the patient to fix the date of presumed conception; the ordinary term at which gestation would be completed is thus determined; and I have told her to come again for examination at a period of one or two months after the expiration of that term. Then, the appointed time having gone by without fruit, the dreaded phantom has sometimes been exorcised. Even then, perhaps, not without reluctance; for in spite of shame, of self-reproach, of the fear of ridicule and loss of position, the dear delusion has been hugged as a proof of sexual capacity.

Dr. Crichton Browne relates* a remarkable case in illustration of the influence which the mind can exert over the uterus and ovaries. A woman long past the climacteric, whose last child was fifteen years old, was admitted into the West Riding asylum, declaring she was two months pregnant. To this assertion she held firm; and at the end of seven months informed the attendants that she was in labour. She persisted resolutely during four days in going through the performance. At last when exhausted, as one who had gone through a protracted labour, the catamenia, which had been suspended for years, appeared. In many other cases where insanity could not be said to exist, the delusion has been carried to the extent of imitating or pretending labour.

An analogous form of pseudocyesis occurs in young women who have secretly incurred the risk of pregnancy. Sexual and emotional excitement, and fear of consequences, have been attended by suppression of menstruation, enlargement of the abdomen, disorder of digestion involving nausea and flatulence, swelling and pain in the breasts. Imagination strengthened by fear does the rest. And occasionally the conviction of pregnancy persists, although the menstrual function is regularly performed. Similar symptoms may arise in single young women independently of sexual relations, as the result of mere disordered menstruation.

Again, a woman marries within the age when pregnancy is to be expected. A similar train of symptoms quickly follows. The strongest evidence on the other side is unwillingly received. The regular return of the catamenia, the stationary size of the abdomen, the absence of many subjective signs of pregnancy, the assurance of the physician that the decisive objective signs also are wanting, are all held of little account. Here imagination is strengthened by hope. The doubting physician is himself doubted; and he must often be content to appeal to time, the great solver of mysteries.

The phenomena of pseudocyesis, however, most commonly occur at the climacteric epoch. And they are often very puzzling. Many things concur to put on the semblance of pregnancy. First, there is the probability of pregnancy. The social condition, the history, an existing family, a hitherto normal ovario-uterine life, the age not yet beyond the liability, all concur to strengthen the patient's belief. The irregularity or suspension of menstruation, the contemporaneous enlargement of the abdomen and breasts, all collected, make up an imposing aggregate of symptoms, easily accepted as decisive proof of that which is hoped or dreaded. To this array of symptoms, slight nausea and various nervous phenomena are frequently added. There is much that is real to lend colour to the belief in pregnancy. Imagination supplies the missing links in the chain of evidence, and binds all signs, real and unreal, together into one whole, which is confidently affirmed to be beyond the possibility of dispute. So vivid indeed is the emotional and mental force, that it creates the symptoms which are wanting. The woman who has been pregnant before, calls upon her memory; and so keen is the edge set upon perception by fancy, that feelings counterfeiting those she really experienced in earlier years arise as it were at her bidding. And by a similar process, the woman who has never been pregnant, conjures up into seeming existence the signs which are suggested to her eager mind by hearsay or reading.

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* "Brit. Med. Journal," 1871.

It will often appear cruel to break down the fond delusion, by explaining these ambiguous phenomena by another theory. But it must be done. About the age of fifty there is, as Gooch said, a torpid state of the uterus, with a flatulent state of the intestines. The omentum and parietes of the abdomen often grow very fat, forming what Baillie called "a double chin in the belly." Wind and fat combine to form the tumour which simulates the gravid uterus. Air moving about in the bowels gives the sensation which is taken for the movements of the child. The enlargement of the breasts is also due to fat.

The *diagnosis* ceases to be puzzling when we carry out the proper physical exploration, that is, when we substitute scientific objective inquiry for the patient's description of her subjective sensations.

Obesity is rarely limited to the abdomen and breasts; it is seen in the limbs and face also. And it is an aphorism generally true, that when a woman is getting fat she is not pregnant. Although the breasts are large, they want the characteristic changes of pregnancy. The abdominal enlargement is felt to be doughy, yielding before firm pressure, nowhere giving the sensation of a defined firm globular tumour, and consequently not giving the peculiar feeling of a wavy or living impulse under the hand, which marks the peristaltic movement of the uterine wall, or the movements of the fœtus. Percuss, and where the pregnant uterus ought to be, you hear nothing but empty resonance. Auscultate, and you hear the rolling of confined air, borborygmi, instead of the fœtal heart. Give chloroform, as Simpson recommended, and the "phantom-tumour" disappears; the relaxed abdominal walls allow the hands to sink freely down upon the spine and into the pelvis.

There is nothing solid. All that is not fat has vanished into thin air. Examine by the vagina, the finger touches a hard os uteri, probably low down, and near the centre of the pelvis; not, as in pregnancy, soft, and directed backwards. There is no large solid mass in front of the cervix, but a small uterus, freely moveable, which, under chloroform, and sometimes without, may be defined between the finger in the vagina, and the hand pressed in above the symphysis.

Although we may have proved the patient to be in error as to the existence of pregnancy, we must not hastily conclude that she requires no care. Her distress is often real. The nervous symptoms forming an element in the general climacteric disorder will be discussed in connexion with this subject. I will only stop here to say that in many cases, a well-adapted abdominal belt will give great relief, by supporting the distended bowels, and the omentum and abdomen weighted with fat.

After the menopause, uterine diseases, especially of an inflammatory kind, are more rare, and are less active. The general character is rather that of passive congestion and catarrh. But the proneness to organic disease is increased.

The menstrual flow must also be regarded in the light of a safety-valve, whose function is to restore the equilibrium of the circulation. The uterine evacuation takes off the turgescence of the utero-ovarian system of vessels. If this be not done there will be determinations of blood, local hæmostases in places where there is no provision for throwing off the excess with safety. It is only mucous membranes having a convenient communication with the external surface, which can discharge blood with safety; and the uterine mucous membrane is pre-eminently fitted for this purpose. By this evacuation vascular tension is relieved, and a great source of nervous irritation is removed.

In conjunction or not with the phenomena of pseudocyesis, *disorders of the chylopoietic organs* are frequent. That the menstrual flow is an excretion performing to some extent a cleansing or depurating office, cannot be doubted. The manifest relief obtained from distressing symptoms on the appearance of the flow, so often felt, is evidence of this. When this excretion is suppressed, it is natural to infer that the system will feel the want of an accustomed depuratory channel. The liver, the kidneys, the skin will have more to do; and the consequent defective excretion is aggravated by want of exercise.

The difficult or imperfect action of the liver and kidneys is pretty sure to entail local stases in the circulation, and consequent disposition to loading of the heart and great vessels. Hence there is a disposition to *metrorrhagia.* This is sometimes so profuse as to induce a marked degree of anæmia. The hæmorrhage may be alternated with serous offensive discharge, and the suspicion of cancer not unnaturally arises. The sallow skin and offensive discharge may be due to degradation of the blood and decomposition of matters retained in the vagina.

In a considerable number of cases a copious flooding seems to be, if not salutary, at any rate not injurious. I have seen aged women, in whom sudden profuse vaginal hæmorrhage occurred without a trace of disease, recovery following. These cases seem strictly analogous to those of senile epistaxis, which call for plugging of the nostrils.

But in too many cases, disease of a serious character is the cause. Amongst these fibroid tumours and polypi may be found, and cancer is not uncommon.

The *nervous phenomena* are amongst the most important complications. *Hysteria* is frequent. The liability to emotional disturbance is often remarkably exaggerated. *Pseudocyesis,* already described, belongs to the climacteric neuroses.

True *convulsions,* followed by a stage of semi-coma and delirium, sometimes occur. There may be only one attack; but generally there is a tendency to recurrence at more or less regular intervals. The immediate exciting cause is in some cases the habit of periodicity, stimulated or not by remains of ovarian activity. There seems to be a gradual accumulation of blood and nerve-force, which, when a certain tension is reached, breaks out in the way described. If it should happen that a discharge of blood takes place, the nervous phenomena are generally mitigated. The urine may show no trace of albumen.

These attacks are commonly followed by periods more or less prolonged, during which the cerebral functions are impaired. Perception rarely suffers so much as other faculties. Attention is commonly impaired. The patient finds it difficult to follow a conversation, or to keep up a continuous train of thought. Aphasia is a frequent phenomenon. Articulation may be impaired; but the main difficulty consists in finding the word that is wanted. The patient is quite conscious that she is using the wrong word, and tries by signs, or relies upon the knowledge or intuition of those whom she is addressing, to correct and fill up what she wants to express. The mind is essentially right; but the organ of expression is at fault.

The patient is at first stunned by the shock of the attack. Recovery is gradual, sometimes slow. Headache is a common symptom; pains in different parts of the body are felt: there is often a marked disposition to sleep. The want of rest is attested in many ways. She is easily exhausted by exertion, bodily or mental.

In some cases the phenomena may be described as *epileptoid* only. There is not complete loss of consciousness, but a degree of vertigo. The face becomes pale, cool; and irregular movements of the limbs are performed.

In another class the symptoms are *syncopal* in character.

For some time there is almost complete loss of consciousness. At least in many cases there is no subsequent recollection of what occurred during the attack;—nothing but a confused notion of the circumstances attending the beginning and the recovery from it. The patient may fall down, suffer injury, and yet be unaware of what has happened.

Associated with this kind of attack, and no doubt to a great extent accounting for it, there is often a weak condition of the heart. The organ is badly nourished, loaded with fat deposit, if not also degenerated in fibre; it is dilated, and incapable of acting efficiently under the call of sudden excitement or exertion.

I have already observed that apoplexy and eclampsia are more likely to happen at the climacteric period. But the cases are more frequent in which these diseases are simulated. Many women complain of a *partial hemiplegia,* chiefly of sensation. This is not always preceded by coma or convulsion; the mind is unaffected; the patient can walk nearly as well as usual, and without any perceptible dragging of one leg. She describes various subjective symptoms, as numbness, coldness, tingling in the arm and leg. No difference in temperature of the two sides can be detected.

With or without these apparent paralytic phenomena, there are frequent alternations of *flushes in the face, and chills.* These are apt to come on on the slightest fatigue or emotion, and constitute one of the most frequent conditions which harass women of a certain age. The flushes are often visible to others; the face becomes red, or even empurpled, and there is a feeling of giddiness or vertigo. These are no doubt the result of that extreme tendency to sudden aberrations of nerve-force and of blood-supply, so characteristic of the "change." It seems as if the equable distribution of health were replaced by irregular supplies sent in excess to particular organs, or vascular and nervous regions. I have several times known forms of climacteric disorder attributed to organic mischief of the nervous centres. The mimetic features of this disorder are extremely close and interesting, and may simulate almost all the described forms of nervous disease.

Lithiasis is especially apt to arise at this period, and may give rise to those attacks of excruciating agony characteristic of the irritation of gravel in the urinary track. These attacks must be distinguished from the pain which attends some forms of uterine disease.

Gall-stones also are apt to be troublesome under the same conditions. The loaded portal system, the sluggish liver perhaps undergoing some organic change, easily engender disorder. The gorged state of the portal system and the pressure upon the kidneys, are shown in the turbid urine, loaded with lithates and phosphates, and occasionally containing albumen and biliary matter. Vomiting often attends this condition. Alkaline salines steadily administered offer the best means of relief.

The general character of climacteric nervous affections may be broadly expressed by saying that there is *disturbance* of the nervous functions, and not organic *disease.*

The *treatment of disorders of the menopause.*—The principle of dealing with these, flows from the observation of their natural history. Our care must be directed to counteract the sluggishness of the liver, and the imperfect action of the other digestive organs; to regulate the circulation and the secretions; and to guide aright as far as possible the nervous functions.

In the disorders attended by plethora, florid complexion, tendency to *embonpoint,* and convulsions, abstraction of eight or ten ounces of blood from the arm will often be of signal service. If this be considered too great an outrage upon the ex-sanguineous therapeutics of the present day, we may compromise the matter by applying four or six leeches to each temple or behind the ears. I have frequently seen the greatest benefit from cupping, taking by this means eight or ten ounces of blood from the nucha or between the shoulders.

The loss of a small quantity of blood will often act in the most remarkable manner. That I have seen lives saved by this practice, that conditions threatening cerebral congestion or apoplexy have been averted by it, I have no manner of doubt. I have seen women conducted over the greatest perils of the critical age by occasional leeching and cupping, combined with judicious medicinal and hygienic management. These abstractions of blood, small as they are, produce good results out of proportion to their quantity. They act as derivatives as well as evacuants. By taking off vascular tension, and diverting the current of the blood to the surface they equalize the circulation, and free the central organs gorged with blood approaching to stagnation. They act, in short, as the most direct and effective substitute for the wanting menstrual bleeding.

The regulation of the secretions is best effected by occasional resort to alterative remedies, as blue pill with colocynth or aloes and belladonna; podophyllin; salines, of which the best is acetate of ammonia; a little colchicum is often of signal service. The habitual use of Pullna, Hunyadi, or Friedrichshall waters is often of great service. Gout, or a condition allied to it, is not an uncommon complication. Lithia is a useful addition to the saline. The skin should be kept in working order by exercise and baths, and often the addition of Vichy salts to the baths will be useful. The nervous centres are calmed and regulated by occasional sedatives, as the acetate of ammonia with Battley's solution, or chloral. A most valuable remedy is the bromide of potassium. This may be given in ten-grain doses or larger, two or three times a day for a considerable time, with occasional intermission, taking care to resume it whenever the nervous symptoms threaten to return.

To equalize the action of the heart and counteract local stases, salines are again of value, and their good effect is often enhanced by digitalis or aconite.

Where there is deficient tone, as is often the case, quinine and strychnine with mineral acids are indicated. Amongst other useful properties, these agents possess that of improving muscular tone, and thus of counteracting the sluggish condition of the intestinal canal.

The establishment of an issue in the back of the neck or on the arm, operates as a valuable derivative. I have known women kept free from nervous seizures so long as an issue was open, and be again subject to them when the issue was healed.

Attention to the diet is of the utmost importance. Many things which have come to be looked upon as necessaries, but which are really luxuries, must be given up, or taken with the strictest moderation. The food should consist of fish, meat, poultry, game, carefully but plainly cooked, bread, vegetables, and fruit. The allowance of meat should be restricted to one meal a day. Spirits generally should be avoided, port should be shunned absolutely, and sherry taken rarely; sparkling wines mixed with soda or seltzer, claret, carlowitz or hocks may be allowed to the extent of two or three glasses daily. Beer, as a rule, is unsuitable for climacteric women. All the nervous abnormities, and the disposition to hæmorrhages, are unfortunately liable to be seriously aggravated by the frequent resort to alcoholic stimulants. Patient and friends, excited or alarmed, are impelled to "do something." The habit of flying to the ready and tempting aid of the bottle is easily acquired; and then the ills of alcoholism being added to those already existing, a vicious circle of morbid reactions is set going, and gathers strength with every revolution. This observation applies with even greater force to the habitual use of chloral and chloroform. Sooner or later the nervous system is sure to break down under this inconsiderate practice.

Sometimes the troubles of the menopause subside gradually and entirely. But they rarely disappear altogether in less time than two or three years. The woman then seems to take a new lease of life. She resumes her physical and mental power. Sometimes, however, these troubles persist and merge into those which mark the period of decrepitude.

THE DISORDERS OF SENILITY OR DECREPITUDE.

As the ovaries and uterus pass into atrophy, and shrink, the woman may be said to become asexual. The economy is no longer dominated by the sexual apparatus. Some women continue to lay up fat, and in these the gastric troubles increase. Others emaciate, the fat is absorbed; and as the "padding" disappears, the pelvic organs, wanting their external support, tend to fall through. Hence the "senile prolapse," so prevalent amongst women who are compelled to lead laborious lives.

The atrophy of the uterus not seldom involves the obliteration of its cavity, or, more frequently, atresia at certain points of the canal. This closure is especially liable to happen at the os internum, and at the os externum. This last condition is not at all uncommon. The vaginal-portion shrinks away; the os contracts to a point, sometimes closing altogether (see Fig. 14, p. 31). The vagina also undergoes a kind of atrophy; the roof is contracted, and gives to the examining finger the sensation of a funnel-shaped *cul-de-sac*, in the centre of which the small dimple-like os uteri is felt. The mucous membrane is often pale; the glands have in great part disappeared or undergone degeneration. The tissues have lost elasticity.

The uterine mucous membrane is now liable to what may be called senile catarrh. There is a chronic secretion of mucus, which, when moderate in quantity, and not impeded in excretion, may entail little distress. But it not infrequently happens that through the atrophic atresia of the os externum, the mucus secreted in the uterine cavity is retained. In this case, colic and other consequences similar to those which characterize retention of menstrual secretion, arise. The remedy is similar. It consists in dilating the closed os by incision or by tents. Then, astringents can be applied to the uterine cavity.

This chronic senile catarrh is very often a continuation of catarrh which began at an earlier period. The discharge is sometimes muco-purulent. In this case there is often some persistent hypertrophy of the vaginal-portion. The margin of the os uteri commonly shows a ring of intense red colour. This, says Whitehead, is a sure sign of endometritis.

We have already, when studying the climacteric condition, referred to the "senile hæmorrhages." There are various troublesome affections of the skin which appear at, and after the climacteric period. Alibert observed many skin-eruptions only twice during life, that is, before the appearance of menstruation, and after its cessation. The predisposing cause appears to reside in the unhealthy state of the blood and nervous system, which underlies so many of the climacteric troubles. Amongst other evidences of this we see a greater disposition to gout, rheumatism, and neuralgia. A transient form of erysipelas is not uncommon. These will be discussed under "Diseases of the Vagina and Vulva."

CHAPTER X.

THE RELATIONS OF MENSTRUATION TO VARIOUS DISEASES—THE INFLUENCES OF OVULATION AND MENSTRUATION IN EVOKING MORBID INFLUENCES.

In discussing this subject it would be convenient to consider, first, the influence of disease in other organs or in the system generally, upon the function of menstruation; and secondly, the influence of ovulation and menstruation in producing diseased action in other organs, or in the system at large. In a considerable number of cases this could be done. But there are other cases in which the action and reaction are so close, that it is scarcely possible to get at the first factor. So we are compelled by clinical necessity to study some cases from both sides, that is, to observe the reciprocal influences of ovulation, and menstruation, and diseased actions.

In some diseases, menstruation is diminished or altogether arrested. This is especially the case in chronic wasting diseases which induce degradation of the blood. Phthisis is a marked example of this kind. Ovulation, indeed, is not arrested, but the ordinary menstrual discharge gradually diminishes, and generally ceases altogether. This is partly due to the waste of red-corpuscles; partly to the diminished force of the circulation; partly to the morbid process causing derivation of blood away from the uterus; and partly from impaired nutrition of the ovaries. Louis observed that cessation of the menses was seldom delayed beyond the onset of the tubercular hectic. Acute lung-inflammations do not entail much interference, menstruation usually appearing notwithstanding. In the great majority of affections of the spinal cord, menstruation is not suspended.

When menstruation makes its appearance in the course of a disease, especially in fevers, it has been looked upon as critical, and as exercising a favourable influence. There is little evidence of the truth of this theory. Perhaps the case is, that when the disease is going on favourably, there is more probability of menstruation being restored. At the same time a useful indication may sometimes be drawn from the manifest relief which follows the appearance of the menstrual flow in many morbid conditions, to solicit or promote the flow or to establish an equivalent for it, by a topical or general bleeding.

In exanthematous fevers, as small-pox, scarlatina, measles, or typhoid, sanguineous discharge occasionally takes place from the vagina. Sometimes this is undoubtedly menstrual. But in most instances it is to be regarded in the same light as the other hæmorrhages which occur under similar circumstances. These fevers, especially small-pox and typhoid, induce a state of blood favourable to extravasation from mucous membranes and skin. The utero-vaginal tract is of course likely to be the seat of this effusion; and if menstruation be impending, the flow will probably be profuse. Under these circumstances, blood may flow back from the Fallopian tubes, and escape into the peritoneum, constituting retro-uterine hæmatocele.

We have another example of hæmorrhage from the genital tract in "malignant jaundice," or "acute yellow atrophy of the liver." Here, also, there is no special tendency to metrorrhagia. The genital hæmorrhage is simply the result of a general alteration in the blood which disposes it to exude from all the mucous membranes.

As this subject has not attracted the attention it deserves, I am happy to have the opportunity of embodying the results of extensive observation and inquiry, kindly made, at my request, by Dr. Clapton. *Phthisis,* he says, in nearly every case stops menstruation; in the majority, abruptly, but sometimes after gradual diminution. Not uncommonly phthisis appears to be developed in consequence of emansio mensium, but in almost all these instances there is evidence of scrofulous diathesis. In *Scrofula,* there is great irregularity as to time, quantity, and character. As a rule there is delay, deficiency, or suppression. In *Bronchocele* menstruation is generally scanty and pale. In *Neuralgia* it, as a rule, diminishes. Neuralgia is often associated, either as cause or effect, with dysmenorrhœa. *Malarious affections* diminish the secretion; the colour is pale. *Chorea* is not common after puberty, except in pregnant young women; but when it does occur it is generally associated with either dysmenorrhœa or emansio mensium. The influence of *Epilepsy* is uncertain; menstruation is generally regular, but if not, there is a tendency to excessive or too frequent flow. *Hysteria* is sometimes cause, sometimes effect of amenorrhœa; it is usually associated with dysmenorrhœa; more rarely with menorrhagia. Inflammatory and congestive *diseases of the brain* and spinal cord tend to increase the menstrual flow, the *degenerative* tend to diminish it; *paraplegia,* if from hyperæmia, increases, if from anæmia decreases the flow. *Mania* generally increases the discharge; *melancholy* diminishes it; *dementia* usually occurs after cessation of catamenia; in *idiocy,* in the majority of cases, menstruation is regularly performed, in others there is emansio mensium. Surgical injuries, attended by *shock or concussion,* generally check menstruation if occurring during the flow, but tend to induce it, if occurring during the intervals. *Pyæmia* at once suppresses the discharge. In *secondary syphilitic affections* there is no alteration. (This I would qualify by observing that where the uterine mucous membrane is affected as it often is, there is a tendency to menorrhagia.) *Purpura* disposes to uterine hæmorrhage. *Typhus and enteric fevers and exanthemata* retard, and sometimes suppress for a long time after the attack. In some of the worst cases there is uterine hæmorrhage at the time. *Rheumatism and gout* have little apparent effect, except that in rheumatic fever menstruation is generally delayed. After one attack of acute rheumatism, menstruation is usually suppressed for a month or two. *Congestive liver diseases* often for a time increase, whilst the atrophic diseases diminish or suppress it. Chronic *diarrhœa or dysentery* tend to diminish or suppress. Of *kidney diseases,* the inflammatory or congestive generally increase menstruation, whilst the fatty and amyloid diminish or stop it. *Diabetes* diminishes, and after a time stops the secretion, but in some cases there is no change. *Heart diseases:* distension of the right cavities, and affections of the mitral valves tend to increase, whilst aortic diseases generally diminish or stop menstrual flow. In *emphysema and asthma,* as a rule, there is no change; if any, there is dysmenorrhœa. In *chronic bronchitis* and *pneumonia* there is no change.

My observations generally agree with Dr. Clapton's. But I have seen striking instances of *asthma* coming on at every menstrual epoch.

The modifications induced in the course of inflammations, acute or subacute, by menstruation, deserve careful attention. In several cases observed at St. George's Hospital by Dr. Lacy when my assistant, and myself, it was found that the temperature rose 1°, 2°, or 3° F. at every menstrual epoch. Hence we draw indication to moderate nervous and vascular tension at the menstrual epoch.

Acne is one of the forms of skin affection induced or influenced by disorder of menstruation. At least an eruption of this form has been noticed at every month when menstruation has been suppressed, and has ceased when the function was restored. The internal administration of arsenic is often useful in these cases. The acne pustules may be touched with butter of antimony, taking care to neutralize the caustic immediately with a little solution of bicarbonate of soda.

The *influence of ordinary menstruation upon the breasts* has been already alluded to. Of the influence of obstructed menstruation upon morbid conditions of the breasts I have seen several remarkable illustrations. Some years ago a single lady came to me from the country, suffering so much from dysmenorrhœa that her health was breaking down. She had, besides, a suspicious hard tumour in the left breast, for which she consulted the late Mr. C. H. Moore. The dysmenorrhœa I concluded was due to extreme narrowing of the os uteri. I dilated this by incision, and almost complete relief from dysmenorrhœa ensued; and whereas the tumour in the breast had previously been progressing unfavourably under monthly exacerbations of pain and swelling, it now became quiescent, and scarcely gave any distress. Several years have now elapsed, and the tumour is still dormant. Mr. Moore was himself so struck with the beneficial effect attending the relief of the utero-ovarian distress, that he read a paper on the case before a meeting of the British Medical Association. It is one amongst many proofs constantly observed in practice, of the wisdom, when cases of complicated diseases come before us, of eliminating any one of the complications that may be within our power, in the assurance that, generally, the remaining diseases will be mitigated, and the load borne by the patient be by so much lightened.

Menstruation induces a state of hyperæsthesia or nervous erethism, under which, evils that in the intervals lie dormant or quiescent are brought into prominence. It is quite a familiar experience to observe intense facial *neuralgia* recurring at every menstrual epoch. A lady came under my care for endometritis following abortions induced by a syphilitic diathesis, and who had also a stiff knee with chronic synovitis, for which I referred her to Mr. Curling. At every period pain came on in the knee, and her lameness was worse; and at the same time an old syphilitic eruption on the chest would reappear. As the syphilitic condition mended the knee got better. She returned to Canada much improved. I saw her in 1876, that is, more than two years afterwards, when I found that her leg was still better.

The influence of chronic nervous disorder upon ovulation and menstruation is not often very clearly marked. But sudden strong emotions, acting as it were by shock, often exercise an unmistakeable influence. In some cases, profuse flooding is produced; in others the secretion is checked, and even protracted amenorrhœa is induced.

Négrier says, "Softening of the brain does not always suspend menstruation." The ovaries receive their innervation from the ganglionic system. For the like reason chronic affections of the brain do not usually interrupt ovarian functions. On the other hand, ovarian function exerts great influence upon diseases of the brain, especially when the ovaries are unusually developed. Thus, ovulation sensibly aggravates intellectual disorders, and frequently stamps them with an hysterical character.

As *epilepsy* sometimes attends the menopause so it sometimes attends the onset of menstrual life. A young lady came several times under my observation at the age of sixteen and afterwards. She never had fits in infancy or childhood. At fourteen menstruation began; it soon became arrested or irregular, and epileptic fits appeared. The epochs were indicated by pelvic uneasiness; the fits generally occurred a week after the menstrual effort. Her aspect was heavy, but she was not wanting in intelligence. There was a scrofulous diathesis. By the application of leeches to the inside of the thighs at the epochs, and the use of bromide of potassium, she greatly improved, and when menstruation was properly restored, she had no more fits.

In my Lumleian Lectures I have given many illustrations of the relations of menstruation and pregnancy to convulsive diseases. It is clearly shown that the exaggerated nervous and vascular tension attending these analogous conditions, inducing probably altered nutrition, may not only determine convulsive disorders, but may evoke a dormant proclivity to them. Thus menstruation or pregnancy may bring back chorea, epilepsy, or ague, which had been believed to be cured.

This is further justified by the proposition I have on many occasions stated and illustrated, namely, that menstruation and pregnancy are the grand tests of the soundness of the constitution.

Marotte * adduces interesting illustrations of the relations of epilepsy with menstruation. Leuret relates a case of mania recurring at every period, and subsiding with the appearance of menstruation. Négrier relates an interesting case of epilepsy occurring under ovarian irritation and flow to the head. She had only a rudimentary uterus, whence it may be inferred that the fits were in some measure due to the want of the regulating influence of menstruation.

The relations of the sexual functions to the various kinds of insanity, form a subject of the highest clinical interest. The occasional outbreak of insanity after childbirth unequivocally demonstrates the influence of childbirth upon the nervous system. Phenomena scarcely less striking are not seldom seen in connexion with disorders in the menstrual function. There is evidence to show that disease of the ovaries is occasionally the exciting cause of mental disease.

Dr. R. A. Davis says: "In all the cases, whether puerperal mania, ordinary mania, or melancholia, during menstruation, the symptoms are mostly aggravated. In the cases of melancholia and of those having a suicidal disposition, extra watching is required lest they should commit suicide during the menstrual periods. I find in nearly all cases on first admission, that the menstruation is either very irregular, or suppressed for some time beforehand."

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* "Rapports de l'Épilepsie avec la Menstruation." (*Revue Méd. Chir.*, 1851.)

Négrier relates the following amongst other interesting cases:—X——, aged seventeen, menstruated at fourteen, was seized with hysteriform symptoms coinciding with menstrual derangement. After several closely succeeding convulsive attacks, this girl, well brought up, and very intelligent, became insane, exhibiting erotic delirium, obscene talk and acts. Secluded in an asylum, under most cruel treatment, she recovered after a year, married at nineteen, and had six children, all of which she suckled. She gave no further sign of mental disorder.

"Pregnancy exerts a happy and powerful derivation in insanity, especially if this state of the encephalon has for cause a nervous disorder of hysterical form." The condition being that the ovaries are kept in abeyance during the temporary rule of the uterus. This is strikingly shown in the following case of Négrier:—X —— was hysterical from nubility, was seized with insanity almost immediately after marriage; always recovered her intellect during her numerous gestations, and during the first months of suckling. She relapsed into her mental alienation as soon as the ovarian function manifested itself.

Dr. Crichton Browne, medical director of the West Riding Asylum, bears decided testimony to the inter-reactions of the ovario-uterine and nervous systems:—"A condition of mental agitation may, he says, derange the menstrual discharge, and ideas may modify the nutrition of the sexual apparatus." It is, Dr. Browne observes, in the close and subtle relation between the brain and the pelvic viscera that the source of hysterical mania must be sought. The one constant element in all cases of this disorder, is a disturbance of the balance of action and reaction which subsists between the nervous centres and the reproductive organs. In every instance of it, the brain and the uterus have their functions constantly deranged; for whatever may be true of simple hysteria as encountered in general practice, it would not hold good of hysterical mania as seen in asylums, that it may accomplish its whole course without the involvement of the generative system. The morbid process may originate in the brain or in the uterus; but in either case it spreads from the one to the other, and upsets that harmony and proportion of function in which health consists. "As the result," Dr. Browne further says, "of large experience of hysterical mania, I am satisfied that it is, without exception, preceded or accompanied by some derangement of the reproductive system, the existence of which is most frequently indicated by alteration or obstruction of the monthly discharge. Even where, however, neither amenorrhœa, leucorrhœa, nor menorrhagia can be discovered, other signs of disorder in the functions of the reproductive organs can be found, if carefully looked for."

The rapid, almost sudden bursting into womanhood, attests the influence of the complete evolution of the sexual organs. The nervous system especially is profoundly affected; sentiments, disposition, pursuits are changed. Menstruation, a function compounded of increased nervous and vascular tension, of ovulation, an effort at reproduction, and of a periodical discharge of blood, exercises a twofold influence upon the general system. The relations of the discharge have chiefly attracted attention, whilst those of the higher antecedent functions have been comparatively overlooked. Although the menstrual discharge may, by its variations in character, frequently give note of what is passing in the ovaries, we must be careful not to conclude that this is always so. We cannot depend upon the menstrual discharge as a constant index of the state of the ovary.

Whenever an organ is the seat of a secretion, it is endowed with a particular mode of vitality in relation with the function it has to fulfil. When this secretion is periodical, there are alternations of action and of repose, which preserve the equilibrium of action of the different organs. When the activity is spent upon one point, there is derivation at the expense of other parts; and every exaggeration of this activity is a disturbance of the general equilibrium; in the same way as the sudden cessation of the function recalls the activity to another organ, which becomes the seat of a movement of fluxion appropriate to its structure. It is thus a dynamic metastasis rather than a transmigration of fluids. This is so true that, when it does not appear in its ordinary, that is, critical form, it is upon the nervous system alone that this deviation of activity is concentrated, and some disorder of nervous function is manifested.

So long as the function of menstruation is accomplished normally in all its conditions, there is nothing, *quoàd* this function, to disturb the harmonious balance of the nervous system. But let the function be attended with pain, shock to the nervous centres is inevitable; and it is henceforth only a question of time, how long the brain and spinal cord will withstand the irritation of continuous or intermittent painful impressions, before the healthy equilibrium is overturned, and before morbid deviations of nervous energy become manifested. The time of resistance will vary with the absolute and relative force of the two factors at work. If we look upon the nervous centres as the resisting or conservative power, and the aberration of the menstrual function as the assailing power, it is obvious that, where the nervous system is robust, pain will make less severe impressions and slower inroads; and that, on the other hand, where the nervous centres are very susceptible, pain is felt more acutely, and will sooner break down the conservative resistance. In practice we may see frequent illustrations of this proposition. Dysmenorrhœa, at first, leaves but an evanescent depression; after a time, the prostration and nervous irritability are continuous, only remittent in degree; later still, attacks of hysteria, neuralgia, and other nervous disorders are developed, and the general health breaks down under the continual wear and tear, and perverted distribution of the nervous power.

CHAPTER XI.

OVARY: ABSENCE OF; ABNORMAL CONDITIONS OF; DISPLACEMENT: PROLAPSUS; HERNIA; HYPERÆMIA; HÆMORRHAGE; ANOMALIES OF CORPUS LUTEUM; INFLAMMATION (OOPHORITIS); TUBERCLE; CANCER; SOLID TUMOURS; FIBROMA.

BOTH ovaries are hardly ever absent, unless when there is defect of the whole sexual apparatus. They commonly exist well developed when the uterus is absent. Deficiency of one ovary is rarely observed when the rest of the sexual organs are well developed. When an ovary is wanting, the Fallopian tube of the same side is also wanting, or is only represented by a solid cord running from the uterus. Occasionally, says Rokitansky, an ovary may be missing, from having been twisted off by a process of atrophy, through dragging upon its attachments, and then, sometimes, a bit of the tube has gone with it. This may take place in the fœtal state, and the ovary may quite disappear. Sappey relates that in a woman who had had several children he found both ovaries adherent to the left iliac region, and completely detached from the uterus.

Atrophy of the ovaries, independently of the normal involution at the climacteric, is not seldom observed within the period of child-bearing as the result of exhausting diseases. The existing follicles shrink away, new ones are not formed, and the stroma retracts; on the surface, all trace of recent scar is wanting.

DISPLACEMENTS OF THE OVARY.

The ovary is subject to various displacements. These arise:

1. From changes in its own condition, as of bulk, the result of inflammation or other disease.

2. From pressure of other organs or structures upon it, as tumours.

3. From dragging of the uterus.

4. From inflammatory adhesions binding it down in unnatural positions.

5. From relaxation of the vagina and other structures, which support the uterus and ovaries *in sitû.*

1. *Displacements of the Ovary from its Altered Bulk.*—The most frequent, or at least the most familiarly known, are the displacements which ensue upon enlargement of the ovary from cystic disease. I must refer to the chapter on Ovarian Dropsy for further description of the displacements from this cause.

Slightly increased bulk and weight, acting concurrently with the relaxation induced by morbid action, may cause the ovary to drop; and if it drop, it must fall into the recto-uterine pouch, tending to get behind the uterus. This movement from the lateral position towards the median line is the necessary result of its attachments. The ovary is suspended at the side of the uterus on a plane posterior to this organ by a chord represented by the Fallopian tubes and ovarian ligament. As the ovary descends it describes an arc, of which this chord is the radius; and thus, unless the uterus descends *pari passu,* the ovary must come behind it.

This has been called *prolapsus of the ovary* by Rigby and others. It gets between the rectum and the uterus. It is, says Rigby, of great practical importance, producing intense suffering. There is a peculiar sickening pain about the sacral region extending to one or other groin, and coming on in paroxysms of agonizing severity. Sometimes there are intermissions; at others only remissions. The source of the pain is connected with the rectum, the passage of fæces being difficult and painful. The patient describes it as a sense of obstruction up the rectum. Rigby likens it to orchitis. There is throbbing, sense of bursting, aggravated by menstruation and coagula; the stomach is irritable, vomiting being frequent. Great pain is felt on touching the os uteri, but this is owing to pressing the cervix back upon the ovary. If the finger is pressed behind the os, by vagina or especially by rectum, it touches the painful spot directly; the oval moveable ovary is then felt. It is almost necessarily enlarged by the strangulation caused by the displacement. The ovary may be fixed in this abnormal position by adhesions. Until the ovary attains the size of a Tangerine orange or more, it is almost always felt on one side of the uterine neck; as it enlarges it tends to get more in the median position, filling the recto-uterine pouch. But even then it generally throws the body of the uterus somewhat over to the opposite side. It is an observation made in connexion with my investigations into the characters of Douglas's pouch, that the left ovary is more frequently prolapsed than the right. But I have frequently known the retroflected uterus to be mistaken for a prolapsed ovary. The diagnosis is made with certainty by passing the sound into the uterus. This done, if the mass is lifted up away from the finger, and the fundus uteri be felt supported on the sound by the hand above the symphysis, we know the case is retroflexion. If, on the other hand, the sound goes the normal length in the normal direction, and the mass, tender to touch and moveable, is still felt behind the cervix, the conclusion that it is a prolapsed ovary may be justified.

The symptoms above described are mostly due to congestion or inflammation, which may be either primary or secondary upon the displacement. It constitutes ovarian dysmenorrhœa. Whether there be inflammation or not, dyspareunia is an almost constant consequence.

Simple prolapsus occurs in women of lax fibre, prone to constipation, to passive menorrhagia and leucorrhœa.

An essential point in the *treatment* is to rouse the liver, to clear the intestinal canal by salines, and enemata or alteratives. When the pain is great on touch, opiate suppositories or sedative pessaries should first be tried, unless we are satisfied there is inflammation. In this event leeches to the posterior fundus of the vagina will probably be useful. Hot water injections by rectum or vagina are also useful.

2. *Displacements from Pressure of other Structures.*—Enlargement of the uterus from a tumour in its walls may displace the ovary in various ways. The ovaries naturally follow the uterus in many of the displacements of this organ, as when a retro-uterine hæmatocele pushes it forwards against the symphysis pubis. But as their relative position to the uterus may be preserved, this change of position does not of itself involve any particular symptoms, although the displacing cause may exert such pressure upon the ovaries as to cause pain in them.

3. *Displacements of the Ovary from Dragging of the Uterus.*—If the uterus descend, the ovaries must follow, unless we imagine the Fallopian tubes and ovarian ligaments to stretch. In prolapsus of the uterus the ovaries will be drawn down, preserving their relative position behind the uterus. They are thus brought more within reach of the finger examining by the rectum.

The uterus may be carried up into the abdomen, as in pregnancy. The ovaries then follow, dropping, however, a little to the sides of the uterus. The uterus may also rise out of the pelvis, owing to enlargement from tumours in its cavity or walls.

Retroversion and retroflexion of the uterus, by dragging on the Fallopian tubes and broad ligaments, must pull somewhat upon the ovaries, and in some cases the displacement thus effected is considerable.

The effect of displacement of the fundus uteri is well seen in cases of inversion. The descending fundus drags upon the tubes, tends to draw them into its inverted cavity, and the ovaries seek the same centre, seldom, however, getting quite inside. The ovary rises into the abdomen when it is too large to be contained in the pelvis.

Hernia of the Ovary.—When the ovary enters into the contents of a hernial sac it may be the result of a congenital vice. The most common form is the inguinal, but the ovary has been found in crural, abdominal, vaginal, subpubic, and even ischiatic herniæ. Observed cases permit the following conclusions to be drawn: The pain which attends these herniæ extends from the seat of the strangulation to the uterus, and thus, if by the finger in the vagina we move the uterus, this movement is transmitted to the contents of the hernia. In one-sided ovario-inguinal hernia, the fundus of the uterus is slightly inclined to the side of the hernia, and Seller has drawn attention to the fact that the pains in the hernial sac increase, and are attended by a feeling of dragging, when the patient lies down on the opposite side. The ovaries swell and become more tender at the menstrual epochs, as was observed by Scanzoni, in the remarkable case already referred to under "Menstruation" (see page 201). This periodical swelling was clearly observed and measured in my case at St. George's Hospital. Boivin and Dugès feared that ovarian hernia would either induce sterility or lead to extra-uterine gestation. Since Mr. Curling has shown that hernia of the testicles induces sterility in the male, the first conjecture seems strengthened. But Scanzoni's patient became pregnant. Disse relates a case in which a diseased cystic ovary was the subject of hernia (*Monatssch. f. Geburtsk.* 1857).

Diagnosis is not always easy. An ovoid tumour of firm consistence, painful to touch, especially at the menstrual epochs, may prove to be an enlarged gland or a fibroid tumour. Examination of the tumour after removal may be necessary to its identification.

Treatment.—When the hernia is reducible, the taxis and a suitable bandage should be applied. But if the ovary be fixed by adhesions it will be wise to follow the example of Pott and of Deneux,* and to remove it. The operation is simple. In my case the distress from the swelling of the ovary was so great that walking was impeded, and the wearing a truss, which was indicated by the attending descent of intestine, was impossible. It was therefore removed, and the relief was complete.

4. *Anomalies of relation* are frequently seen in the form of *pseudo-membranous adhesions* of the ovaries. The most common is the adhesion with the tube; next in frequency is the adhesion of the ovary, either with or without its tube, to the hinder wall of the uterus, and the neighbouring parts of the ligamentum latum down to the bottom of the recto-vaginal pouch. These adhesions

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* "Recherches sur les Hernies de l'Ovaire." Paris, 1813.

frequently result from puerperal peritonitis at a time when the uterus is above the usual size, filling the pelvic cavity, and when its appendages are thrown back to its posterior surface. Adhesions of the ovaries also take place to the sides of the pelvis, to the rectum, to the sigmoid flexure, in consequence of pelvic peritonitis to which anomalous maturation and morbid processes in the ovaries, or tubal catarrh has given rise.

Peritonitis determining adhesions of this kind may also be caused by retro-uterine hæmatocele. When the blood-tumour disappears, the relation of the ovaries and uterus may thus remain altered for a time.

When the ovary has contracted adhesions it is subject to dragging from the rising gravid uterus, or from the uterus growing together with the developing pelvis, also from the development of the bladder, sigmoid flexure, or rectum. This dragging commonly causes atrophy of the ovary.

Hyperæmia of the ovary attends the normal as well as the abnormal ripening and extrusion of ova and the results, and especially affects the stroma surrounding the peripheral follicles and their fibrous cavities. The involution of the follicle following on the completion of the menstrual antecedents is also often marked by a considerable vascularity of the surrounding tissues.

Congestion may excite in the peripheral, as well as in the deep-lying follicles, an excessive growth and cystic degeneration. Very often it leads to hæmorrhage, principally in the large peripheral follicles; then there are found one or more projecting sacs filled with lightly coagulated blood, and varying in size from a bean to a nut, or even to a fist. They shrink after the manner of corpora lutea, and sometimes after the resorption of the extravasated blood they remain as cysts and continue to grow. Hæmorrhagic effusions in the ovary are not uncommon. I have seen them, small, in women dying during pregnancy. If they burst the capsule, then there is pelvic hæmatocele in the broad ligament or in the peritoneal sac.

The anomalies observed in the corpus luteum are, according to Rokitansky—1. *Dendritic protrusion of the corpus luteum* outwards through the rent of the follicle. This appears as a villous, soft, reddish-yellow outgrowth continuous with the mass of the yellow body, or as a leaf-like excrescence connected by a branched stalk, on which are small linseed-formed white fibrous bodies.

2. *Duplication of the corpus luteum,* which Rokitansky explains thus: A fresh hæmorrhage takes place prematurely from the wall of a follicle after the formation of one corpus luteum, which detaches the yellow body, pushing it inward, and hereupon a second corpus luteum is formed in the wall of the follicle.

3. Rokitansky describes the following *degenerations of the corpus luteum.* *Cystic degeneration.* The cyst in the periphery of the ovary is found retaining traces of the structure of the corpus luteum, including the scar of the rent, although it may be as large as a walnut. With these cysts there is occasionally seen the remarkable appearance of a primitive communication of the cyst with the fimbriated extremity of the Fallopian tube, resulting from the process of extrusion of the ovum from the follicle and its reception into the tube. These are the so-called *tubo-ovarian cysts* which have been described by Richard.

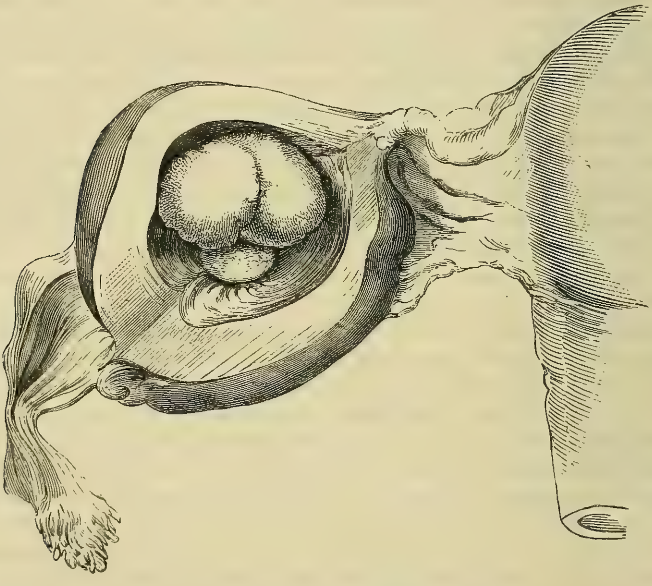

FIG. 72.—(Guy's, 2228^{50}.)

SHOWING A BLOOD COAGULUM IN A CYST OF OVARY (R. B.).

"The ovary forms a cyst with thick walls, and contains what appears to be a coagulum of blood as large as a chestnut."—(Catalogue.)

4. *The degeneration to a fibrous tumour,* which consists in the excessive growth of the yellow body and its persistence in the form of a more or less plainly visible sheath enclosing round fibrous knots the size of a walnut, and a cavity filled with serum. The specimen figured (Fig. 73) seems to be an example of this fibrous degeneration of a Graafian follicle.

5. The degeneration to *Carcinoma* may ensue upon the preceding fibrous degeneration, or occur independently.

"*Congestion of the ovary*" and "*oophoralgia,*" "*neuralgia of the ovary,*" "*ovarian irritation,*" have been discussed in the preceding chapter.

That cases marked by excessive pain are especially apt to pass into inflammation is highly probable. There is congestion of the ovaries, tubes, and uterus beyond the physiological measure, so that escape of blood into the peritoneum is not unlikely to occur. But intensity of pain is not evidence of inflammation. I have known an ovarian cyst to burst, discharge its contents into the peritoneal cavity, and death ensue under the most excruciating agony; yet examination has not shown a trace of inflammation. Again, in these cases we find the uterus remaining moveable, with entire absence of any thickening or perimetric swellings, even after years of suffering. It may be true that the ovary proper may be inflamed alone, but it is hardly conceivable that repeated attacks of oophoritis should fail to involve the peritoneal investment. It is, moreover, scarcely in accordance with the history of inflammation to return in an organ every month, to run its course in a few days, and to leave the organ essentially sound, that is, in a condition ultimately to perform its functions. Yet I have seen cases where this oophoralgia lasted for years, was cured, and healthy menstruation ultimately established.

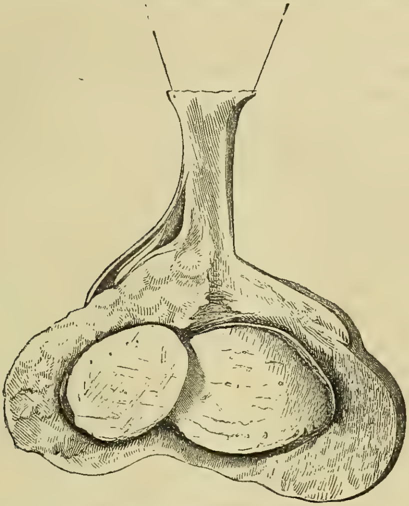

Fig. 73.—(St. George's, XIV. 140. Nat. size.)
FIBROUS TUMOUR OF OVARY FROM A WOMAN ÆT. 50 (R. B.).
The uterus also contained a fibrous tumour.

The *ascertained* conditions are extreme local hyperæmia or congestion, and exquisite sensibility of the ovaries, combined with great irritability of the nervous centres.

These conditions furnish the indications in *treatment*. It is very important to eliminate the idea of inflammation where the thing does not exist, because antiphlogistic treatment will in the long run aggravate the disease, and reduce the general powers. Thus I have several times seen great prostration, increase of local hyperæsthesia and of general local irritability produced by the repeated application of leeches to the groins or to the os uteri. It is true that in some of these cases the patients expressed relief at the time; but the relief could hardly be said to be real; it was not attended by cure, and seemed to me to do more harm than good. Counter-irritation in the form of blisters or chloroform-embrocations to the iliac regions has appeared to be beneficial.

Another proceeding very apt to be carried to a mischievous excess is lying down. Nutrition must suffer, and as a consequence the nervous centres become more irritable.

The true course to adopt is to follow the three indications given by—1. The general depression of the system; 2. The exaggerated irritability of the nervous centres; 3. The congestion and hyperæsthesia of the ovaries and surrounding parts.

It is superfluous to enumerate the medicinal, dietetic, and hygienic remedies which help to fulfil the first indication. The task of allaying the extreme irritability of the nervous centres will be made easier in proportion as the general tone is improved. The nervous centres will also recover power as the third indication, that of tranquillizing the ovaries, one source of irritation, is effected.

Rest in the physiological sense, that is, abstinence from "married life" is imperative. To subdue the hyperæsthesia, the wearing for a few hours every day one of the forms of "vaginal-rest" will be found of great service. If there is any displacement of the womb this must be corrected by suitable means. Abrasion, congestion of the cervix uteri, must be cured. I have found it useful to effect a derivative action in the cervix, by making a small eschar on the vaginal-portion with potassa cum calce. This is far less painful and more efficacious than blistering the groins. Bromide of potassium acts in some degree as a sedative of ovarian excitement; but it is not to be depended upon alone. Sedative pessaries containing opium or belladonna applied to the fundus of the vagina a day or two before the advent of the menstrual epoch are useful. The bowels must be well regulated to prevent accumulation in the rectum. Salt-water or Vichy baths, tepid or cold, according to the season, are often eminently useful.

INFLAMMATION OF THE OVARY.

It is not within the scope of this work to describe the diseases of the puerperal state. I pass over therefore those forms of oophoritis with which pathological anatomists are most familiar.

The oophoritis of childbed is seldom met with, perhaps never, apart from complication with inflammation, extending from the uterus, tubes, and broad ligaments. The ovary is not affected primarily, but is caught secondarily in the spread of an active inflammation which invades most or all of the pelvic structures. It is difficult so to isolate the oophoritis in these cases as to extract any trustworthy facts to illustrate the history of pure oophoritis. Nor do we derive a much larger amount of precise information, *ad hôc*, from the examination of subjects who have had oophoritis apart from childbed. Here, too, the oophoritis is not often simple, but a part of an inflammatory process involving other structures.

Simple oophoritis is rarely fatal; so that the opportunities of seeing the condition of the ovary under the influence of acute or recent inflammation are necessarily rare. Rokitansky declares that apart from childbed oophoritis is very rare. But this statement must be taken as expressing the experience of the dead-house. I believe that simple, or conjoined with metritis, it is not uncommon. But as the cases recover more or less perfectly, distinct evidence of the inflammatory action to which the ovaries have been subject is rarely seen. All such evidence had disappeared during life, or had become confounded with the results of complicating diseases.

One of the most frequent conditions found is fibrinous adhesions of various age uniting the ovaries to the sides and posterior surface of the uterus, to the broad ligament, or other neighbouring structures. These are often found in women who have never borne children. We are thus driven to the conclusion that women are liable to frequent pelvic inflammations apart from pregnancy. These adhesions of course are the residua of peritoneal inflammation, and commonly extend beyond the ovaries to other parts of the pelvic peritoneum.

Assuming that the ovarian implication is often secondary, it cannot be doubted that there are cases of primary oophoritis proper. All active function involves determination of blood to the organ performing it; but there is hardly any organ whose functional activity attracts blood in such profusion as the ovary. It goes beyond simple transient hyperæmia; the rush and work are so violent that actual extravasation of blood and laceration of structure take place. It cannot then be surprising that under certain conditions interfering with the normal accomplishment of this function, activity so great should pass the narrow physiological boundary, and terminate in inflammation.

Scanzoni describes the post-mortem appearances in what seems to have been a typical case of acute oophoritis. The subject died of pneumonia, the result of cold, and with symptoms of peritonitis in the right ovarian region. In this situation was found a mass of coagulated fibrin, the size of a fist. On removing this the right ovary was seen two inches long, nearly as much across, and one and a half inches thick. It was ovoid, considerably enlarged, as the measurements show; its surface was violet-blue, covered with numerous dilated veins, and near the inner angle of the posterior surface was a black spot, the seat of recent rupture of a vesicle. The organ was pasty, almost fluctuating in parts. On incision there escaped a considerable quantity of blood, and the section showed the same violet colour, and some veins strongly congested. The ruptured vesicle still held some liquid black blood. Towards the other extremity of the ovary, where the congestion was less intense, there was an abscess in the parenchyma; and at the side were other smaller abscesses, all deep in the parenchyma. This case shows a combination of all the forms of oophoritis.

Causes.—Oophoritis may be said to be almost strictly limited to the reproductive period of life. It is accordingly found to arise under conditions which offer obstruction to the ordinary course of the ovarian function. Impressions, physical or emotional, occurring during menstruation may goad the physiological congestion into inflammation. It has followed operations on the os uteri, and intra-uterine injections, and the spread of blennorrhagic inflammation along the Fallopian tubes. Ricord described this last form as analogous to the orchitis arising from blennorrhagia in the male. Its origin in obstructed menstruation will account for the fact of oophoritis being more frequent in virgins than inflammation of the uterus, which as yet has only entered upon the subsidiary function of menstruation.

It is often secondary upon disease of the uterus, tubes, and broad ligaments. The intimate vascular communications between these organs offer a ready channel of extension for inflammation from the uterus.

The dysmenorrhœa resulting from a contracted or nearly impervious os uteri is very likely to induce chronic inflammation of the ovary.

Retroversion is a frequent cause of swelling and great tenderness of the ovary, not unfrequently amounting to oophoritis, from the fundus of the uterus pulling the ovary backwards, and thus by the tension of the broad ligaments producing obstruction to its returning circulation.

Sexual intercourse for the first time, or in excess, particularly if during the menstrual nisus, especially if there have been previously an irritable state of the ovary, with dysmenorrhœa, is not unfrequently followed by oophoritis.

Early abortions also may lead to the same condition.

Oophoritis, arising otherwise than in childbed, is often single. But the ovaries appear to be subject, like the eyes and other double organs, to consensual suffering. Thus, inflammation of one ovary is likely to be followed by inflammation of the other. In some cases it is easy to observe that common predisposing and exciting causes act upon both ovaries alike, although one may be affected earlier and more severely than the other.

Inflammation of the Follicles of the Ovary.—Apart from the ordinary peritoneal inflammatory action proceeding from the ripened and burst follicles, one or more ripe follicles may be seen with injected walls, red, softened, easily torn, with turbid, flocculent, puriform contents, and the surrounding parenchyma infiltrated. This leads to atrophy of the follicle, or causes its degeneration to a cyst.

Négrier describes "*Vésiculite*" simple. In most cases the trouble remains local. A point of the ovary becomes tumefied and torn, an inflammatory areola has surrounded the little wound, sometimes has invaded the peritoneal investment, and even the pelvic peritoneum. "Vésiculite" is "simple" when easily stopped, and ending in resolution. "Vésiculite" is "grave," when ending in suppuration, or when the inflammation has spread widely to the pelvic peritoneum.

Kiwisch says the inflammation of the follicles is commonly confined to one Graafian vesicle. An indication of the inflammatory process is seen in the menstrual metamorphosis of the follicles. The products of this inflammatory condition are more or less plastic, and in general much infiltrated with blood; the follicle is distended to the size of a pea or a cherry. When several follicles are implicated, the surrounding stroma participates in the inflammatory condition, and is found in a state of hyperæmia, serous infiltration, or inflammatory softening.

Parenchymatous Oophoritis.—This very rarely runs to suppuration. It often, however, leads in young persons to peritoneal false membranes and adhesions, to increase of bulk and thickening (sclerosis) of the stroma, thickening of the tunica albuginea, with atrophy of the follicles, especially of the peripheral ones, and enlargement of the ovary, with tuberose surface.

Inflammation of the stroma is rare in the non-puerperal state. Kiwisch relates two cases in which the entire organs were affected, both ending fatally in a short time; in the one by acute abscess, in the other by a sanious disintegration. In both consecutive peritonitis was the cause of death.

Simple peritoneal oophoritis can hardly be said to exist. It is peritonitis, not oophoritis; and the inflammation will rarely be limited to the surface of the ovary. Ovarian peritonitis is commonly a part of the wide-spread pelvic peritonitis of childbed, or other forms of general pelvic peritonitis. Primary ovarian peritonitis is more frequently limited to one side, and is the result of, or attended by traumatic or other lesion proceeding from the bursting or disease of a Graafian follicle. But even in such a case the inflammation is very apt to spread to peritoneum beyond the ovary.

Symptoms and Diagnosis.—When oophoritis is complicated with metritis and pelvic peritonitis, its special symptoms are lost or confounded in those of the attendant inflammation. The peritonitic symptoms especially preponderate, and govern both diagnosis and treatment. Where ovaritis is simple, or the chief morbid condition, the symptoms being more concentrated, ought to be more characteristic. But they are not free from ambiguity. The local symptoms attending many severe cases of dysmenorrhœa are referred by the patient and traced by the physician to the ovary. Intense pain in the ovarian region, swelling and tenderness of the ovary under touch, burning, shooting pain in the pelvis, pain in defæcation, febrile movement, including hot skin and quickened pulse, suggest inflammation, and seem to fix that inflammation in the ovary. But these symptoms subside in a few days, as menstruation passes off; and if we now examine the ovary we may find little or no tenderness or swelling. If, then, inflammation attended the painful menstruation, it was an inflammation of a very transient character.

Pain in the region of one or other ovary, even if increased by pressure, is not, as we have seen, sufficient evidence of oophoritis. Pain of this character is a frequent, almost constant, attendant upon inflammation of the neck of the uterus. On the other hand, ovarian disease is very liable to be overlooked, because attention is likely to be concentrated on attendant uterine disease.

Before concluding that the ovary is inflamed, we must continue our observations during the inter-menstrual period. The history of the onset and progress of the affection will offer different points. If intense pain referred to one or other ovarian region supervene quickly on exposure to cold, excessive venereal excitement, emotion, in the course of blennorrhagia, or after operations on the uterus, or intra-uterine injections, the state of the pelvic organs should be explored by internal and external palpation. It is probable that the uterus will be found to share in the tenderness and swelling which affect the ovaries; perhaps, too, the broad ligaments and pelvic peritoneum will be involved. Where this is the case, it will be difficult to get at the ovaries, which will be surrounded by swollen and tender structures. But where the ovary is principally affected, or when the concomitant affection of the uterus and other structures has subsided, the state of the ovary comes into prominence. Palpation supplies the only trustworthy evidence. In every examination per vaginam, the finger is first directed as a point of departure to the os and cervix uteri. On touching this part, pain will in all likelihood be caused, and we may conclude that the uterus is the organ at fault. The pain may, however, be due to the pressure of the uterus upon the inflamed ovary. We therefore seek to eliminate the uterus by pressing the finger gently against the vaginal roof in front, at the sides of, and behind the uterine neck. When pressing at one or both sides upwards, the pain will be greater, and we may possibly, by conjoint external pressure on the abdomen, embrace the painful structures between the two hands. This deep pressure in the sides of the pelvis on the abdomen alone causes pain, and there is a feeling of resistance, caused partly by the swelling of the parts, and partly by the muscular tension exerted instinctively to ward off the dreaded pressure. But the clearest evidence of the state of the ovary is to be attained by the recto-abdominal touch. The ovaries, especially if inflamed, can commonly be reached by finger in the rectum; and this the more surely if they be pushed on to the examining finger by the hand pressed firmly down upon the uterus through the abdominal wall. We may then recognize the ovary by its form, position, mobility and tenderness, and judge by its increased size, and pain on touch, whether it is inflamed or not. But the ovaries, even much enlarged by inflammation, may be insensible to considerable pressure—a proof, says Schultze, that oophoritis need not necessarily implicate the peritoneum.

There are many examples in medicine of treatment becoming an element in diagnosis. But the conclusions drawn in this manner are sometimes fallacious. Thus it is frequently observed that ovarian pain and other symptoms taken to indicate oophoritis are cured by cauterizing the os and cervix uteri, which may at the same time exhibit marks of disease. It seems rational to infer that the ovarian symptoms were only symptomatic, or dependent upon the affection of the uterus; and in the majority of cases this, I believe, is true. But it is also true that the treatment applied to the uterus may really have cured ovarian disease, first, by acting on the principle of derivation or counter-irritation, and secondly, by removing uterine disease, which was the source of disease in the ovary.

The pain is chiefly due to peritonitis, which is almost certain to ensue. Tumefaction is so inconsiderable in recent inflammations that it can hardly be the cause of marked subjective symptoms, and it is not easy to measure it even by physical examination. An inflamed ovary seldom exceeds twice its ordinary size.

Menstruation may be suppressed, or there may be an increased flow.

In very rare cases the affection proves fatal in a few days. This termination is due to sanious decomposition of the ovary, or to acute perforation by an abscess.

Where it commences with unusually severe symptoms, and particularly when it leads to extensive degenerations of the ovary, or causes much peritoneal exudation, it may continue for weeks or months with more or less marked remissions. In other cases perfect intermissions occur, and the paroxysms are synchronous with the catamenial periods. In the most favourable cases, which are also the most common, after a short time the exudative process is arrested, and the exudation is either removed by absorption, or undergoes the usual metamorphosis into cellular or stringy strata, which bind the ovaries to the surrounding structures. Sometimes a fibrous condensation of the exudations takes place, and dense capsules are formed round the ovary, leading to atrophy of its tissue. The exudations into the follicles also lead to various metamorphoses, with shrivelling and atrophy of the affected vesicle.

When the course is less favourable, a new morbid process starts from the inflammation, and abscesses and various chronic tumours of the ovaries are developed.

Professor Faye* relates a case of abscess in the ovary in a pregnant woman. She had been delivered by forceps. During pregnancy (her first) she suffered much from vomiting; and towards the end she had a fixed pain in the right side of the abdomen, and several convulsive fits. On the night after delivery she had severe pains, mistaken for after-pains. Next day, the pains were more bearing-down in character; the abdomen was tender and tympanitic. She died fifty-three hours after delivery. Douglas's sac was found filled with a thin purulent sanguineous exudation. An abscess in the right ovary had burst; the remains of the organ had changed into a mere pulpy detritus. There was considerable degeneration of the cortical substance of the kidneys, and there were many extravasations of blood under the serous membrane covering the kidneys, liver, and lung.

Associated with abscesses, although probably different in origin, is the case narrated by Dr. Farre, "in which the ovary was entirely reduced to a diffluent pulp of a yellow or brownish-green colour, of the consistence, and having somewhat the appearance of very soft putty, immiscible with water. Of this morbid condition, which may, however, be cancerous, I met with a striking example in a case of sudden death occurring in the seventh month of pregnancy. Both ovaries were of the size and form of a bullock's kidney, their natural structure was entirely destroyed, and was replaced by the soft substance just described. The circumstance that both ovaries were thus affected renders it evident that the disease could not have existed in any great degree at the time of impregnation."

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* Schmidt's "Jahrbuch," 1860.

Most of the recorded cases of large abscess holding from one to twenty pints of pus, are probably instances of suppuration taking place in the cavities of ovarian cysts.

The terminations of suppuration or abscess of the ovary are: 1. The ovary may burst into the peritoneum, causing abdominal shock, collapse, or peritonitis; 2. Small perforations may take place, exciting more circumscribed peritonitis, and leading to plastic effusions surrounding the diseased ovary; 3. Adhesions may be formed with the bladder or intestine, and a fistulous communication be established, by which the pus may be more or less completely discharged; 4. The suppurating ovary, being the focus of a pelvic cellulitis or peritonitis, may terminate, after the manner of this form of pelvic inflammation, by discharging into the rectum, vagina, or externally above Poupart's ligament.

The *treatment* must be conducted on the same plan as that which is laid down for pelvic peritonitis which has proceeded to suppuration. The exit of pus should be favoured when there is distinct evidence of eliminatory process. If there is tension and swelling in Douglas's pouch pushing the uterus forwards, puncture should be made by the aspirator-trocar.

Chronic oophoritis is characterized by a sensible deformity of the affected ovary; the surface is knobbed, its consistence harder than normal. This induration results from the hypertrophy of the parenchyma, which in its turn proceeds from the transformation of the effused matter into cellular tissue. Possibly also there is thickening of the tunica propria. Henkel and Virchow compare this to the interstitial hyperplasia of other glands, for example, the cirrhosis of the liver. The thickened capsule prevents the external dehiscence of the vesicles. The ovum perishes in the effused blood in the vesicle. On several occasions Scanzoni found the sanguineous effusion had taken place not only in the interior of the vesicles, but also in their immediate neighbourhood; it thus became evident that the friability of tissue which sometimes accompanies chronic oophoritis is an important cause of what is called apoplexy of the ovary.

Chronic oophoritis may succeed to the acute form; it may be a continuation of oophoritis of childbed, or it may arise in a subacute manner. The causes will be similar to those which induce the acute inflammation. It is extremely probable that cystic disease in some cases, if not in many, takes its origin in a slow inflammation of the follicles. The early stages of cystic disease are often attended by intense pain, and the other signs of dysootocia.

The menstrual flow in the early stages of the disease will generally be increased in quantity and protracted in duration, and irregular hæmorrhagic discharges may occur. At a later period, when probably the follicular structure has become impaired, diminution or suppression of menstruation may be observed. The disease very often affects one ovary only, so that menstruation, or rather ovulation, is not necessarily always attended by dysmenorrhœal phenomena. Not seldom, one or two periods may pass without pain. This may be explained by Négrier's theory of the alternate action of the ovaries. When there is no pain, the healthy ovary is at work. In other cases, every period is attended by severe dysmenorrhœa, and then we may infer either that both ovaries are affected, or that the general pelvic hyperæmia of ovulation may involve the healthy as well as the inflamed ovary.

Leucorrhœa frequently attends, but can hardly be regarded as symptomatic, although the discharge may in some measure be a means of relieving the gorged ovario-uterine vessels.

Impregnation may take place, since one ovary only may be involved; and even where both are involved, there may still remain some follicles in a condition to bring forth healthy ova. Sterility, however, is common, partly because the ovaries are disabled by obliteration of the follicles, or by external adhesions, and partly because pain forbids effective intercourse.

It may terminate in cure by resolution. But it may undoubtedly go on to destroy the proper structure of the organ. The vesicles may become compressed and atrophied, the result being incurable amenorrhœa and sterility.

It may proceed to suppuration, and then the symptoms described under Abscess of the Ovary will be observed.

It has been said that chronic oophoritis may run on for years, or for any length of time, without the ovary becoming fixed by adhesions, and without causing suppuration in the neighbourhood. That this happy negation may occur may be admitted; but I think the escape is exceptional, and agree with Aran, who says the great danger of chronic oophoritis is the constant liability to peritonitis. It is not unreasonable to suspect that many of the cases relied upon as evidence that chronic oophoritis may persist for years without inducing mischief beyond the ovary are examples of oophoralgia without inflammation.

Chronic oophoritis is marked by dull, heavy pain in the seat of one or both ovaries, more or less constant, but aggravated by menstruation, by coitus, by standing or exertion in the upright position, sometimes by loaded rectum or bladder. The pain radiates from the ovary as a centre to the bladder and surrounding organs.

Constitutional symptoms, marked in some cases, attend. There is some degree of fever, accompanied by hectic, if suppuration have taken place. Nervous symptoms, indicating exhaustion, irritability from constant pain, will generally show themselves. But, except in the very early stages, when the disease is likely to be confounded with ordinary dysootocia, the nervous symptoms do not often put on the hysterical form.

To establish a *diagnosis*, pain, as described above, must exist. And besides ascertaining this, we must exclude other pelvic diseases. Where the ovary only is affected, we may by touch determine its increased bulk, sensitiveness, and perhaps prolapsus.

Touch single and bi-manual, vaginal, rectal and recto-abdominal must be performed in the same manner as for the detection of the acute form. Since the inflamed ovary is commonly enlarged, and is disposed to drop behind the uterus, it may be felt in the situation assumed by the body of the retroflected uterus. The sound will lift up the body of the uterus, and the ovary, if adherent to it, as is not unlikely, will be carried up along with it. But by a little care the uterus may generally be isolated from the ovary.

Treatment.—We must rely mainly upon rest, physiological and physical, and derivation. Bromide of potassium, sedatives, occasionally leeches to the iliac region, chloroform-blisters on the same spot, iodine-painting, or, when pain is acute, fomentations or poultices. A valuable means of derivation may be pursued by setting up a small issue or eschar on the vaginal-portion of the uterus by potassa cum calce. This makes a healthy granulating surface which heals with some cicatricial contraction. If the uterus were perfectly healthy one would hesitate before resorting to this remedy; but in many cases there is so much complication of uterine disease as will by itself justify the application.

I have in several cases seen great relief obtained by wearing a Hodge-pessary. It gives relief probably by maintaining the ovary at its proper level, thus favouring rest of the organ and disgorgement of its vessels.

There is a *fibroid degeneration of the ovary* which is attended by complete disappearance of the follicles. There is a remarkable specimen of this kind in St. Thomas's Hospital. Both ovaries are enlarged to twice or thrice the normal size; they are deeply furrowed or convoluted, and sections through their substance present smooth surfaces. This is probably the consequence of chronic inflammation, the contracting parenchyma gradually obliterating the follicles.

TUBERCLE IN THE OVARY

Is considered to be extremely rare. Kiwisch says it is not met with. Rokitansky knows but one case. There were round yellow knots in the ovaries, and also tuberculosis of the tubes and peritoneum. Possibly an unequivocal instance of tubercle limited to the ovaries has yet to be demonstrated. But tuberculization of the ovaries in association with tubercle elsewhere, especially in the uterus, Fallopian tubes, and neighbouring glands is not rare. Thus in St. George's Museum (No. xiv. 78) is a preparation exhibiting scrofulous disease of the uterus, tubes, and ovaries. Both ovaries were converted into cavities, and contained remnants of a thick semi-fluid, tubercular matter. They were greatly enlarged, and their walls much thickened. There was extensive tuberculization of the lungs, and pleurisy, also scrofulous ulceration of the right sterno-clavicular joint. No. xiv. 79 in the same museum is another example.

Some may question the tubercular nature of the matter contained in the ovaries of these and similar specimens; but the probability that the ovaries thus involved should be affected by disease different in character from that which invaded so many other structures in the body is infinitely small. In the case of cancer being diffused through various structures and organs, the cancerous nature of similar disease found in the ovary is not questioned.

Dr. Bristowe demonstrated (*Path. Trans.* vol. vi.) the tuberculous nature of an ovary, diseased in common with the tubes and uterus. The Fallopian tubes were filled with soft tubercular matter. The cavity of the uterus was distended by a mass about as large as a pigeon's egg, of softish, opaque, yellowish-white cheese-like tubercle. The mucous membrane of the fundus was wholly deficient, and the subjacent muscular tissue was irregularly destroyed, the tubercular deposit at many parts extending into the substance of the muscle. The os and cervix uteri were somewhat congested, otherwise healthy. The right ovary was healthy. The left ovary contained two masses of tubercular deposit, one about as large as a horse-bean, the other as large as a Spanish nut. The deposit exactly resembled that in the uterus and tubes. Bristowe says the same thing has been satisfactorily demonstrated by Dr. Ogle. Bernutz and Goupil also describe an autopsy, in which, with much other disease, including tubercular lungs, they found both ovaries containing crude tubercles, just like those met with in the testicle.

The course run by tubercle in the ovary, the disease in this organ being generally secondary, and of minor import than its concomitant presence in the lungs or other organs, scarcely calls for independent consideration. Advancing disease elsewhere, and attendant exhaustion of the whole system, preclude the idea of directing any special treatment to the ovary. Where, however, the ovary is converted into a sac containing tuberculous pus, it is conceivable that this may burst, and thus precipitate death, by causing peritonitis. And it may be possible to evacuate by aspirator-trocar an ovary so affected through the vaginal roof.

CANCER OF THE OVARY.

Cancer resembles tubercle in being a diffusive disease. More frequently than tubercle it is primary in the ovary. But, still, in the majority of cases, by the time at least that it attracts attention in the living, and almost always as it is seen in the dead, cancer has invaded other organs as well. It is frequently consecutive upon disease of the uterus and the pelvic and abdominal glands.

The secondary invasion of the ovary by cancer was accurately made out in a specimen exhibited by Dr. Bristowe to the Pathological Society. In this case innumerable cancerous nodules were attached to the peritoneum. There was also an ovarian tumour showing cancerous disease. The ovarian tumour was essentially unilocular. It was originally an ovarian cystic tumour, the parietes of which had become secondarily involved in cancerous disease from its peritoneal connexion.

Next to cystic disease, cancer is the most frequent disease of the ovary. It is often combined with the cystoid formation. Every form of cancer may be reproduced in the ovary. It frequently appears as medullary carcinoma, in the form of a distinct mass, or of a roundish tuberous tumour completely supplanting the ovary, and growing to the size of a fist, or of a child's head, or bigger. In some places it resembles in its firmness and the preponderance of its framework, the fibrous cancer, in others it is soft, very juicy, fluctuating, encephaloid. The degenerated ovary is sometimes free, but mostly united to surrounding structures by adhesion. In some rare cases, says Rokitansky, carcinoma of the ovary arises from the degeneration of a corpus luteum.

Often, the medullary cancerous degeneration is, in size and form, symmetrical. It occurs especially in young persons as a primitive disease. It is also associated with cancer of the uterus, breast, liver, peritoneum, stomach, intestine, and lumbar glands; and appears as a part of a general wide-spread cancer formation.

How cancer may invade an ovary in the midst of active function is illustrated in a specimen (No. 2640) in the College of Surgeons. It consists of a uterus, with ovaries and appendages. "There is a well-formed fœtus, of about five months, with its membranes and placenta within the uterus. The ovaries are both extensively diseased—enlarged. The tissue of the left is soft, flocculent, and vascular; that of the right is replaced by a collection of cysts, most of which are filled with soft, laminated, and apparently medullary substance."

In St. Thomas's Museum is a similar specimen (No. FF. 51). Both ovaries are of ovoid shape, much nodulated on the surface, and not presenting in any part the appearance or structure of ovary. They appear to consist entirely of medullary (encephaloid) matter. The same disease was found in the mammæ and liver. The woman was five months pregnant with a well-formed fœtus.

Medullary cancer occurs upon the cyst-walls and the cyst-cavities, especially in the form of villous cancer. The gelatinous cancer thus appears in the cystoid growths. On the inside of the cysts, here and there, are seen flat, rounded, medullary knots; or villous, cauliflower-like excrescences. Both grow from all points of the cyst-wall, until they fill the cavity; and at length the growth may penetrate the wall, so that the medullary carcinoma grows free in the peritoneal cavity, seizing neighbouring structures, and the whole cystoid-formation becomes fixed in all directions. This cysto-carcinoma also often occurs symmetrically in both ovaries—more commonly so in the more mature periods of life.

Cancer of the ovary is most frequently seen in the *encephaloid* form. It may attain considerable size, forming a globular mass, with spheroidal knobby projections. Courty relates a case in which a tumour of this kind, weighing about eleven pounds, left the corresponding tube quite unaffected, whilst there was congestive hypertrophy of the uterus, and return of hæmorrhages simulating the menses in a woman who had passed the menopause. The encephaloid masses, diffluent in several places, appeared to have arisen in the Graafian vesicles, so encysted were they; they even seemed, as Rokitansky pointed out in other cases, to have sprung up on the internal membrane of the vesicle, preserving there an areolar or alveolar aspect, whilst the centre was filled with liquid, chiefly blood. Several of the cysts were distended with blood, the result of internal hæmorrhage. In some of the cysts some black pigment was accumulated in the walls.

Cancerous tumours of the ovary sometimes come under the category of *solid* tumours. Thus, the specimen (No. 2246^{45}) in Guy's Museum shows "both ovaries affected by carcinoma, which has converted them into solid tumours, about the size of the human kidney. The subject, aged forty, was under Dr. Gull for carcinoma of the brain, breast, and various other parts. She was delivered prematurely of a child in hospital, a few weeks before her death."

"The most remarkable examples of hard cancers with fibrous tumours that I have yet seen," says Paget, "have been in the ovaries of certain patients with common hard cancers of the stomach or breast. In these cases the place of the ovary on either, or on both sides, is occupied by a nodulated mass of uniformly hard, heavy, white, and fibrous tissue. The mass appears to be generally of oval form, and may be three or more inches in diameter. Its toughness exceeds that of even the firmest fibrous tumour, and its component fibres, though too slender to be measured, are peculiarly hard, compact, closely and irregularly woven. With these I have found only few and imperfect cancer-cells, with more numerous nuclei, elongated and slender. They are not mingled with elastic or other 'yellow-element' fibres."

Melanosis resembles other forms of malignant disease in its diffusive property. I have not met with example or record of melanosis limited to the ovary. Like other forms of malignant disease, it probably almost always attacks the ovary secondarily. There is a good example (No. 31.16) in St. Bartholomew's Museum: "The ovaries are altered in form; their natural structure is removed, and its place occupied by a very soft melanotic matter. There are also some small circumscribed deposits of melanotic matter in the peritoneum covering the uterus. Taken from a young woman in whom melanosis existed in many other organs."

In St. George's Museum (XIV. 112) is a specimen of "simple cysts in each ovary. The following note is probably written by Sir B. Brodie :—"The cysts contained a thick, black, unctuous and nauseous substance of the consistence of tar. A small polypus is attached to the cervix; a small ulcer is seen in the interior of the fundus. The woman had her knee amputated for fungus hæmatodes by Sir Benjamin Brodie, and the disease of the organs of generation was not known during life. Is the colour of the ovarian fluid owing to the same substance as melanosis?" Other illustrations of melanosis in the ovary, attended by similar disease in other organs, are found in the College of Surgeons (Nos. 2642 and 2642A).

The frequent transition from the cystic tumour to *colloid cancer* suggests the suspicion that some forms at least, especially the proliferous, partake of the cancerous character. If this be assumed, then the primary origin of cancer in the ovary must be admitted to be frequent. The history of pathological processes does not, I believe, lend much confirmation to the hypothesis of the ready convertibility of one form of morbid product into another. For example, if I may appeal to my own observation, I should say that fibroid tumours of the uterus are not greatly more liable to the invasion of cancer than is the normal tissue of the uterus. Cancer of the uterus begins as cancer, and not as any other disease. So far, then, as analogical reasoning may be trusted, that which in its advanced stages is obviously cancer, in the ovaries, is, as elsewhere, cancer *ab initio.* That cancer of the ovary preserves for a comparatively lengthened time, its exclusive habitat in the ovary before spreading to other parts, may be explained by the comparatively isolated terminal position of the ovary.

This view is strengthened by the observation that colloid ovarian tumours are often attended by colloid growths in the contiguous structures. Thus in a case I saw at St. Thomas's, in 1874, small colloid pyriform tumours attached by very slender but strong stalks grew from the omentum, where it was in contact with an ovarian tumour filled with colloid. Is it not possible that proliferous cells exude from the colloid tumour, or escape by small perforations, and becoming attached to the adjoining structures there develop? A familiar example of proliferation by contact is seen in the spread of gummata on opposing surfaces of skin and mucous membrane.

This lingering isolation in the ovary must weigh greatly in favour of regarding the compound proliferous cysts of the ovary *practically* as non-malignant, and therefore as being suitable for extirpation.

The strong innate disposition of the ovary to develop cystic formations may determine the frequent assumption, by the original cancerous element, of the cystic or alveolar form.

Cancerous disease of the ovary, as elsewhere, occurs more frequently in middle life and later life; but it may arise in childhood.

When cancer has existed some time in its pronounced forms, and especially when the broad ligaments and glands of the pelvis and abdomen are involved, ascites is a frequent complication.

The course of ovarian cancer is frequently involved in that of malignant disease elsewhere; but it not uncommonly takes the lead in producing the cachexia and peritonitis which causes the fatal issue.

The colloid cancer grows rapidly, and to a large size; but does not quickly tend to destroy life by contaminating the system. The opportunities of examining the primary stages of its formation are therefore rare, except in cases where the affected ovaries have been removed by operation. Mr. Heath exhibited to the Pathological Society (*Path. Trans.*, vol. xvi.) a specimen of cancer of both ovaries, in which death was produced by obstruction of the bowels. I have seen an autopsy at St. George's Hospital, in which death ensued from uræmia, the result of invasion of the ureter and atresia at the point of contact with a cancerous ovary. The ureter above this spot was much dilated, and the kidney was partially atrophied.

Diagnosis.—The circumstances which, according to Dr. T. Gaillard Thomas, most prominently point to the development of the disease, are:—"1st. The rapid development of a solid tumour in an ovary, with 2. Marked depreciation of the strength, spirits, and general condition. 3. The occurrence of œdema pedum and spanæmia at an early period, and consequently dependent upon a general blood-state, and not the consequence of pressure. 4. Lancinating and burning pains through the tumour. 5. Cachectic aspect. 6. The occurrence of ascites without evidence of cirrhosis or other hepatic disease; organic disease of the kidneys, or heart, or chronic peritonitis; the fluid accumulating in such large amounts as to force aside the supernatant intestines, and produce dulness in place of resonance on percussion in dorsal decubitus."

These signs must, however, be taken with some qualifications. Œdema of the legs and ascites are not constant, even at stages when the disease has produced marked ravages upon the general system. I have, moreover, found it in practice difficult to distinguish solid malignant ovarian tumours from malignant disease around the caput coli.

Solid Tumours of the Ovary.—For want of more precise pathological materials for discrimination, it is convenient to group certain tumours of the ovary under this general term. On clinical grounds this distinct recognition of solid tumours of the ovary is of great value. The solid tumours include not only fibrous or fibro-cystic tumours, but tubercular and malignant tumours of the ovary. Solid tumours in the ovary then, frequently, are a local expression of diffusive disease which involves other organs as well. This consideration of the characters of solid tumours will strengthen the rule to hesitate before attempting the extirpation of solid ovarian tumours. Of what use, for example, would it be to remove a cancerous ovary, when it is in the highest degree probable that the disease has extended to other organs?

A. Fibroma. Fibrous or fibro-muscular tumours of the ovary are so rare that their existence has been doubted. In some instances where it has been concluded that one or both ovaries had been the seat of fibrous tumours, it is reasonable to conjecture that the tumours really arose in the uterus, and, becoming pedunculated, pressed upon the ovaries, whose proper structures became obscured; or tumours arising in the broad ligaments may simulate ovarian fibroids. At the same time, since fibrous and non-striated muscular elements form a natural constituent of the ovary, there is sound histological reason for admitting the possibility of tumours being developed from exaggerated extension of these elements.

There is a specimen in the London Hospital Museum described by Dr. Ramsbotham (No. Ea. 27) as "a large fibro-muscular tumour projecting from the fundus uteri. The ovaries are as large as a hen's egg, nodular surface, and converted into dense fibrous masses."

Cruveilhier had drawn attention to the fact that fibrous tumours were found implanted upon or in the substance of the ovary, which by their structure could not be distinguished from fibroid tumours of the uterus. He observed that they were often found at the same time in both organs, as in the specimen referred to of Dr. Ramsbotham. Dr. Baillie also was struck with the identity of structure, and observed that these tumours of the ovary ran the same course, and were liable to the same cartilaginous and bony transformations as the fibroids of the uterus.

In Guy's Museum is a specimen (No. 2246) consisting of uterus and ovaries. "The latter are converted into large tumours, each the size of a cocoa-nut, by the production of a fibro-plastic material. The stomach was affected in the same way by a growth which resembled that seen in the recurrent fibroid tumours." No. 2225 in the same museum shows both ovaries converted into solid tumours. The tumours are quite smooth externally, and the section exhibits a perfectly homogeneous appearance.

A specimen in St. George's Museum (No. XIV. 140) seems to offer the clearest features of a fibrous tumour of the ovary. It is represented in Fig. 73. It is described in the catalogue as "A fibrous tumour of the ovary from a woman aged 50, who died of disease of the heart. The uterus also contained a fibrous tumour in its walls." The position of the tumour in this case in the centre of the ovary excludes the objection urged against other cases, that its origin might be uterine.

Dr. Goodhart and Mr. Walsham each exhibited (*Pathological Transactions,* 1875 and 1876) a fibroma traced "unmistakeably" to the true fibrous capsule of the ovary. A specimen at St. George's (XIV. 139) shows calcareous degeneration of an ovarian tumour presumed on this account to be fibro-muscular.

A specimen exhibited at the Obstetrical Society was examined by Dr. Wilson Fox, who described it as a "loculated fibroid; as having in the more central and transparent parts of the loculi a great number of non-striated muscular fibres."

In most of the presumed fibrous tumours the cystic cavities have been the most noticeable features. The cysts may be more or less obliterated by the hyperplastic condition of their walls. These overgrown partitions are made up of a fibrous vascular mass, not in any way distinguishable from that usually seen in cyst-walls. This kind of fibro-cystic tumour grows very rapidly, and has a strong hæmorrhagic disposition, causing in some cases effusion of blood into the cyst-cavity.

It appears then to be highly probable that most of the apparent fibrous tumours of the ovary differ from undoubted cystic tumours, chiefly in the greater relative proportion of the fibrous walls, and the lesser development of the cysts. Scanzoni's larger specimen referred to above seems to confirm this view.

Dr. Wilks reporting on three tumours of the ovary exhibited to the Pathological Society* says the specimens referred to afford examples of the various grades of disease which the ovaries may undergo. We may see in them the connexion between a hard fibrous tumour and the simple cystic disease. We may have in the first place a multilocular cystic disease; then a similar disease with the addition of solid fibro-cellular growths between the sacs; thirdly, a disease made up of the same parts, but where the solid predominates; fourthly, a uniform fibrous tumour; and lastly, a hard dense fibrous growth resembling the analogous tumour in the uterus."

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* "Pathological Transactions," vol. ix.

Dr. Bristowe and Mr. Hutchinson suggest that the absence of muscular fibres in ovarian tumours distinguishes them from the uterine tumours. But this test is fallacious. They admit that large fibrous tumours may grow from the ovary.

B. Enchondromatous Tumours.—Kiwisch says he has observed two examples of this tumour. In one, cartilaginous concretions surrounded the ovary in the form of numerous scales or rounded protuberances. In the other case the right ovary was transformed into a tumour the size of the fist, surrounded with false membranes of which the external layers enclosed cartilaginous nodules, coarse and hard, whilst the interior resembled a cartilaginous mass, hyaline and of less density.

Diagnosis.—During life it will be difficult to arrive at more than a conjectural diagnosis of the nature of solid ovarian tumours, or even to distinguish them from some fibroids of the uterus. Mobility or fixity is the important clinical point.

Treatment.—We may be called upon to interfere, in the event of tumours getting locked in the pelvis and obstructing the bowel or bladder. The first indication would be to dislodge them from the pelvis, by pushing from below either by rectum or vagina. Extirpation might have to be discussed if dislodgment failed. In this case operating by gastrotomy will be generally preferable to attempt at removal by vagina or rectum.

CHAPTER XII.

OVARIAN CYSTIC TUMOURS: THEIR NATURE—SIMPLE; MULTIPLE, PROLIFEROUS; CYSTO-SARCOMATOUS; TUBO-OVARIAN; DERMOID CYSTS.

We have already observed that tumours of the ovary may, for clinical purposes, be divided roughly into solid and cystic. The solid tumours have been described in the preceding chapter. The cystic are the most common, and practically the most important.

Ovarian cysts are distinguished by Paget as *A. Simple or barren,* containing fluid or unorganized matter: and *B. Compound or proliferous,* containing variously organized matters. They may further be usefully distinguished as *Malignant or benign.* All these tumours, on account of their glandular origin, are grouped together as *adenoid.* In association with ovarian cysts proper it is convenient, and even necessary, to study certain *extra-ovarian or pseudo-ovarian cysts.* For example, there are cysts which are developed in the broad ligaments, or which are formed in structures so close to the ovaries that they closely simulate ovarian cysts in the living, and are not always easily distinguished by dissection in the dead.

A. Simple ovarian cysts. The most simple idea of an ovarian cystic formation is derived from the observation of certain specimens of distension or enlargement of Graafian sacs in the early stage. By examining, for example, such a specimen as that represented in Fig. 74, which represents a section of an ovary in St. Bartholomew's Museum, one cannot help being struck with the appearance of the cysts arranged in a row close to the free border of the ovary, just as the Graafian sacs are disposed in the normal ovary. Fig. 75, from a specimen in Middlesex Museum, illustrates the same points. These are, in fact, morbidly-dilated Graafian sacs. In different specimens we may see similar appearances, the cysts being larger and larger, until their distinct existence is lost by the septa between them being absorbed by pressure and atrophy.

That such is the real history and nature of the ordinary simple ovarian cyst is proved by the following observations.

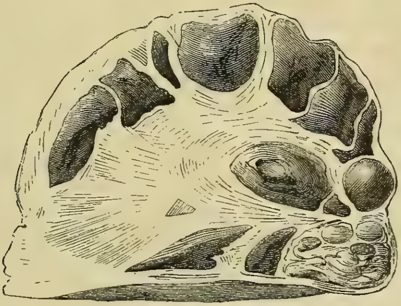

FIG. 74.—(Nat. size.) St. Bartholomew's Museum.
SECTION OF OVARY. EARLY STAGE OF CYSTIC DISEASE (R. B.).

1. The structure of its walls is identical with that of the Graafian sac.

2. Rokitansky* has found ova in cysts of this kind; and this very interesting, if not crucial fact, was verified by the late Dr. Ritchie in 1864. Dr. Woodham Webb confirmed Ritchie's report.

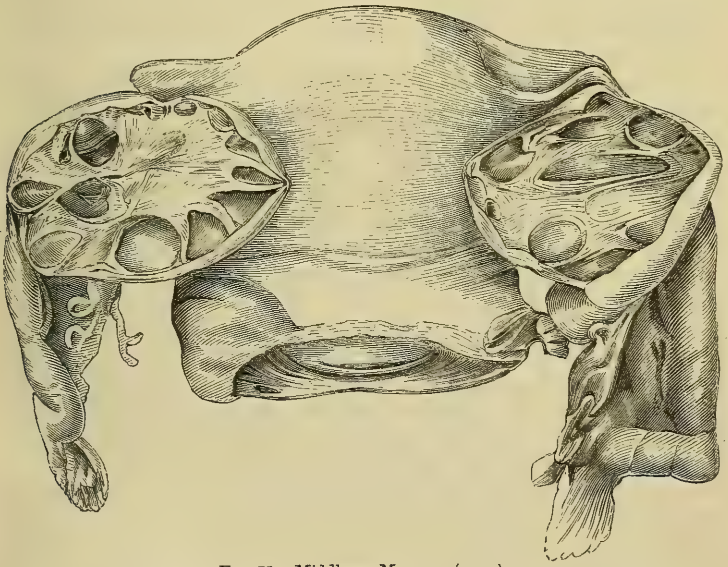

FIG. 75.—Middlesex Museum (R. B.).
SHOWING INCIPIENT CYSTIC ENLARGEMENT OF THE GRAAFIAN FOLLICLES IN BOTH OVARIES.

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* "Wochenblatt d. Zeitschrift d. kk. Gesellschaft d. Aerzte zu Wien," 1855.

Dr. Ritchie* further says:—"Since August, 1864, I have succeeded in finding ova in a large number of ovarian cysts. Some of the ova were perfect, with a sharply-defined zona pellucida, a germinal vesicle, and a germinal spot; others were more or less imperfect, many having the appearances mentioned by Rokitansky. I have never found an ovum in a loculus larger than a cherry, and never in a loculus which contained jelly-like contents."

There is an excellent "Hunterian" preparation in the College of Surgeons (No. 2616), showing incipient ovarian cystic disease. It is "an enlarged ovary, in the interior of which are numerous small oval, smooth-walled cysts, with distinct thin walls, all probably enlarged Graafian vesicles."

3. Cystic disease of the ovary rarely begins except during the period of normal ovarian activity. Cysts have indeed been found in young girls, even under ten; but menstruation sometimes is premature; and some cysts springing from the broad ligaments may have been erroneously regarded as ovarian.

4. Cysts are more frequent in the ovaries than in any other organ; and in many respects they differ from the cysts seen elsewhere. The small cysts sometimes seen on the peritoneal investment of the ovary and of the uterus are different in nature from the true ovarian cyst.

Although it is frequently the case that several, if not many Graafian sacs are affected together, this is not always so. Even in cases where one or more sacs have become so large as to have called for removal by abdominal section, menstruation has continued, and portions of healthy ovary have been found.

Frequently the degeneration of the follicles is symmetrical, both ovaries being affected in a similar manner as in Fig. 75.

Up to a certain point several follicles may enlarge with tolerable uniformity, as in Figs. 74 and 75. But after a while, one generally takes precedence of the rest, and growing more rapidly compresses them, so that they either remain small, or their walls becoming atrophied and thinned, the cysts hitherto distinct are fused into one. By a kind of natural selection one obtains predominance, absorbing the others, or destroying them. Sometimes portions of the minor cysts remain in the form of projecting processes, constituting chambers or loculi, communicating with the large cyst. In this way what are called *multiple cysts* are formed. They are really simple in their nature. Although multiple in number, they are nothing but agglomerations of simple cysts, and do not, collectively any more than singly, possess the distinctive property of the compound or proliferous cyst, that of self-multiplication by endogenous gemmation.

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* "Ovarian Physiology and Pathology," 1865.

In some cases there appears to be one, or chiefly one, follicle affected, and when this happens this follicle may be found not at the periphery of the ovary, but deeply imbedded in the stroma. In these cases it is reasonable to surmise that the ovum was prevented by the thickness of the surrounding structure from making its way to the surface at the proper time; that the effort would result in distension of the sac, the outpouring of an excessive quantity of blood into it; and hence, if the epithelial lining retained, as it is likely to do, its proliferous virtue, the gradual formation of a cystic tumour. In University College Museum (T $\frac{B}{4}$) is a good specimen of hæmorrhage into the ovary. In Guy's Museum is a specimen (No 2231^{20}), showing "an ovary much distended, having been filled with blood." (See Fig. 72.) There is also an excellent specimen in St. George's Museum.

Dysmenorrhœa is a frequent antecedent of ovarian dropsy This observation corroborates the opinion that some obstruction to the due maturation and escape of ova is one cause. It has often been conjectured that a single life, by suppressing one ovario-uterine function led to abnormal action of the formative-force. Out of Spencer Wells' 500 cases 221 were unmarried, and 18 were widows. On the other hand, the complication of ovarian dropsy with pregnancy is not very uncommon.

What is the beginning of this transformation of the Graafian follicles? The formative-force is peculiarly active in the ovary. If interrupted or hindered in its ordinary progress, it may be supposed that, still persisting, it will reveal itself in abnormal results. In University College Museum (No. 866) is an interesting specimen, which may serve to illustrate the effect of obstruction to the healthy course of menstruation. It exhibits cysts in the ovaries and tubes, and a fibroid tumour of the uterus inside, which probably obstructed the uterine openings of the tubes. Rigby says he traced in one case an ovarian dropsy from its beginning in oophoritis. Scanzoni says there is no doubt that dropsy of the Graafian follicles is sometimes caused in this way: the menstrual congestions in the ovaries do not attain sufficient intensity to effect the bursting of the follicular wall, and the result is that an increase of secretion and its accumulation in the cavity thus takes place. The follicular wall is thus gradually hypertrophied, and by the formation of new vessels causes a permanently increased secretion. The comparatively great frequency of these follicular dropsies in women who have long suffered from chlorosis or other diseases, combined with amenorrhœa, speaks in favour of this view.

B. The principal varieties of the *complex or proliferous ovarian cysts* have been described, as Paget truly says, "to the very life" by Dr. Hodgkin, to whom we are indebted for the first knowledge of their true pathology. Hodgkin divides them into two principal or extreme forms of endogenous cysts; namely, those which are broad-based and spheroidal, imitating more or less the characters of the parent cyst, and those that are pedunculated, clustered, and thin-walled. Between these forms many transitional and mixed forms may be found. A typical example of the first is in the Museum of the College of Surgeons (figured p. 417 of Paget's work). It is a large cyst, with tough, compact, and laminated walls, polished on both their surfaces. On its inner surface there project, with broad bases, many smaller cysts, of various sizes and variously grouped and accumulated. These nearly fill the cavity of the parent cyst; many of them are globular; many deviate from the globular form through mutual compression; and within many of them are similar but more thickly-walled cysts of a third order.

Respecting the mode of generation of the endogenous cysts, they appear to be derived from cell-germs, developed in the parent cyst-walls, and thence, as they grow into secondary cysts, projecting into the parent cavity; or disparting the mid-layers of the walls, and remaining quite enclosed between them; or more rarely growing outwards, and projecting into the cavity of the peritoneum.

Dr. Wilson Fox* says, "All the forms of cysts met with in the ovary originate from the Graafian follicles, and that the multilocular forms are not the result of any special degenerations of the stroma of the ovary, but are due to secondary formations from the interior of parent cysts thus formed." He divides them into three classes. The first and most frequent manner in which secondary cysts are formed is the result of the production of a series of glandular structures, presenting a tubular type, on the inner wall of the parent cyst. Dr. Fox describes the mode of formation of these glands as differing from those of other glands, which for the most part originate in the embryo as diverticula from surfaces. The process in this case commences with a stratification of the epithelium, into which project papillæ formed of the stroma of the wall of the parent-cyst, each papilla carrying a delicate vascular loop.

The characters of the *proliferous form* are well described by Wilks and Moxon :—"The capsule is thick, whitish, fibrous, the interior of the greater cysts pale, their contents glairy or more tenacious, often turbid, and more or less deeply-discoloured. The inner surface of the large cysts is softish-looking, and bears more or fewer knobs or excrescences of some form standing up in relief. The walls of the smaller cysts are more vascular; sometimes they have a honeycomb-like or cribriform appearance from fringes of membrane coursing about on them with variable divisions and reunions, while the more solid-looking parts and the section of the solid-looking excrescences are, at first glance, not unlike cancer, being pink, creamy, and vascular.

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* "Medico-Chirurgical Transactions," 1864.

"The appearances under the microscope differ according to the part chosen. The wall of a large cyst is fibrous, generally laminated, the inner part more delicate and areolar, with vessels visible in it; the lining covered with epithelial cells, generally cylindrical; these are easily removed. The same

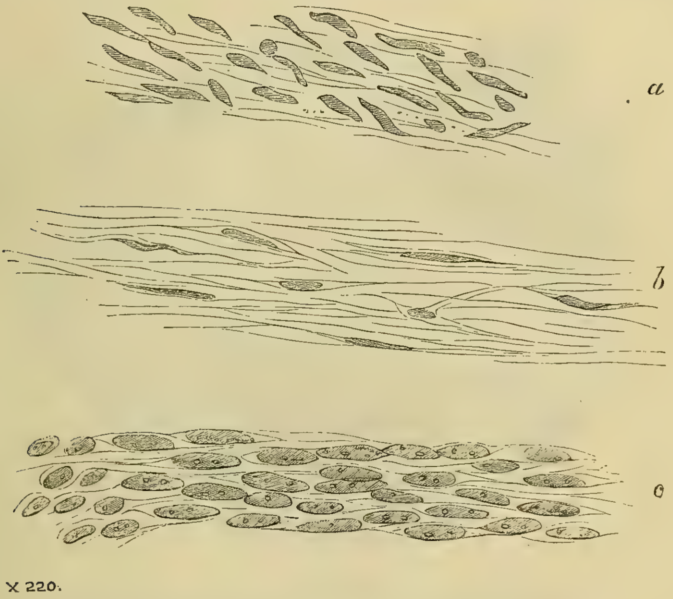

Fig. 76.

FIBROUS STROMA OF COMPOUND CYSTIC TUMOUR OF OVARY (BY H. ARNOTT).

cylindrical epithelial cells, perhaps generally ciliated, usually much defaced, float in the mucous fluid; but pus or blood may be present. If you take the wall of a smaller cyst it shows signs of greater activity, and is more full of vessels and the epithelium more regular. But the most striking characters of this kind of cysts are seen in the formation of bud-like processes within the cysts; they are best brought to view in the most solid-looking parts, and especially within the larger or smaller excrescences on the walls of the principal cysts. These microscopical bud-like knobs grow out and branch, uniting with each other, forming arches, or they extend across the cavity they are in, and thus spaces are enclosed which, in section at least, look very like mucous follicles; and they are lined with the cylinder epithelium, which usually everywhere clothes the buds. The buds have vessels in them; they branch and branch until they no longer are clothed with a distinct epithelium, but the twigs confuse each other, and the cells are massed together like those of cancer. This we have seen in parts of a tumour where other parts showed the usual bud, and in this case there were metastatic formations in the liver, thus showing that this form of tumour, when very vivid and rank in its growth, will prove malignant like any other."

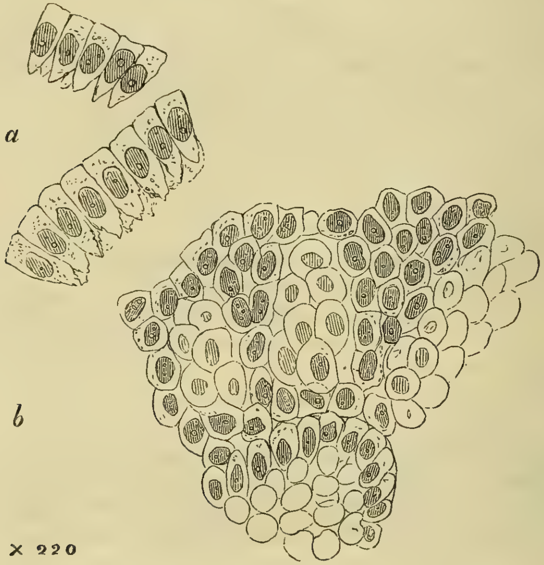

FIG. 77.
EPITHELIAL LINING OF A COMPOUND OVARIAN CYST (H. ARNOTT).

The histology of these tumours is well illustrated in Figs. 76 and 77, for which I am indebted to Mr. Henry Arnott. Fig. 76 represents three thin sections from the solid stromal portions of a multilocular cystic tumour, removed by Mr. Croft, in November, 1872. The specimens were fresh and stained with carmine. All show varieties of developing fibrous tissue.

Fig. 76 *a*. Dense connective tissue, studded with irregular rod-shaped nuclei; the outlines of the cells not discernible.

b. Delicate connective-tissue, with slender cells at rare intervals.

c. Rapidly-growing connective tissue, rich in nuclei, plump and oval, which can be seen here and there, to be contained in large spindle-cells.

Fig. 77 shows epithelium from the inside of the same compound cystic tumour.

a. Detached flakes of columnar epithelium, viewed sideways.

b. Part of a large surface of epithelium, lining a small cyst; showing the polygonal aspect of the columnar cells as seen from above, and showing, besides, dilatation of the wall, in which the cells appear swollen and partly out of focus, rendering their nuclei less distinct.

Cysto-sarcoma of the ovary.—Müller applied this name to those tumours in which the fibrous intercystic substance equals or exceeds in quantity the contained fluid. Brodie called them sero-cystic sarcomata. However, all degrees may be observed in different tumours, and we cannot therefore venture to separate abruptly ovarian cystic tumours into different classes. Good typical examples of all of them—*a,* the simple; *b,* the simple but multiple cyst; *c,* the proliferous or compound cyst; *d,* the proliferous or compound cyst, with colloid contents; *e,* the proliferous, with large sarcomatous formation—may frequently be met with; but in a large majority of instances, ovarian tumours share the characters of two or more of these varieties. The more active the proliferous tendency, the further the departure from simplicity of organization, the more nearly does that tumour approach in its relations to malignancy. Whether, however, any form of ovarian tumour, excepting the fungoid (medullary) is truly cancerous in its tendencies, is a

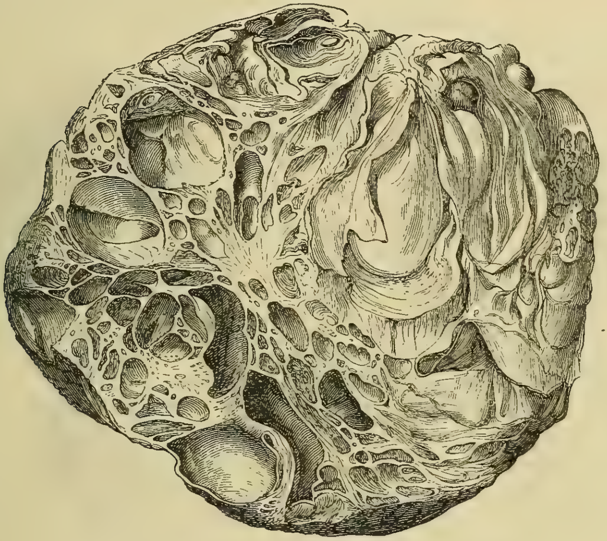

Fig. 78.—Univ. Coll. Mus., No. 5054 (from nat. half-size).

SECTION OF AN OVARIAN TUMOUR SHOWING THE ALVEOLAR STRUCTURE (R. B.).

matter of much doubt; and practically all must be treated as if it were proved that they are not so, unless they are solid.

Alveolar or colloid tumour of the ovary is a not infrequent form of the compound cyst. It contains very numerous loculi, which are filled with a semi-solid tenacious substance resembling gum. It, however, often complicates tumours in which many cysts contain fluid, and which resemble those of the common compound form.

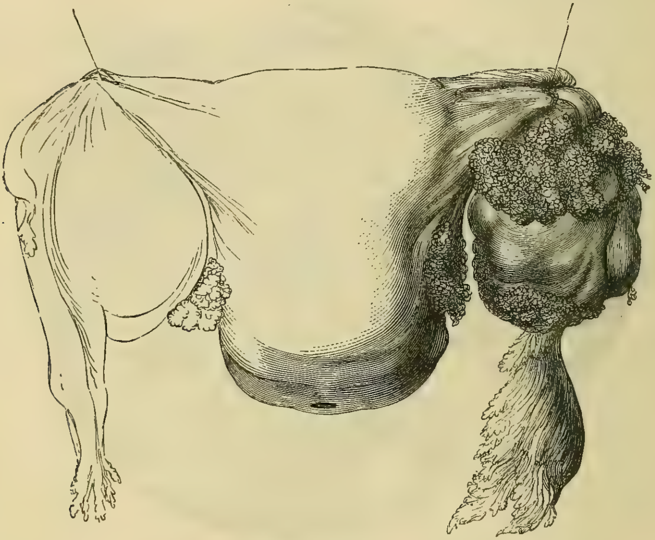

Fig. 79.—Univ. Coll. Mus. (from nat. two-thirds size).

BOTH OVARIES AFFECTED WITH PROLIFERATING (MALIGNANT ?) OR PAPILLARY DISEASE. DENDRITIC PROCESSES PERFORATING THE INVESTING STRUCTURES (R. B.).

Fig. 78, taken from a specimen in University College Museum, prepared by Dr. Fox, exhibits a section of the colloid or alveolar tumour.

Fig. 79, also from a preparation in University College Museum, exhibits a form of proliferous cyst. Both ovaries are affected. In one the cyst is perforated by a dendritic proliferation. By eccentric pressure, the result of endogenous growth, the capsule of the ovary has given way, so that the dendritic processes project on the surface.

Tubo-ovarian Cysts.—Adolphe Richard * first described a form of cyst, into the composition of which both the Fallopian tube and the ovary entered. He detailed five observations, and cited analogous cases from Morgagni, Frank, Chambon, Boivin and Dugès, Kiwisch, and others. He demonstrated that ovarian cysts may open into the uterus by the tubes ; that after having received the fluid of the cyst, the tube continues to undergo a pathological action, by which its calibre increases, its length being doubled, its walls thickened, the folds of its mucous membrane smoothed out ; that lastly, the dilatation extending gradually to the internal part of the oviduct, the communication between the canal of the dilated tube and the cyst remains, and there is thus made up a cavity or cyst compounded of dilated tube and the ovarian cyst.

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* "Mémoires de la Société de Chirurgie," 1856.

My former colleague at the Western General Dispensary, Mr. Anderson, described a clear case of tubo-ovarian cyst. A woman who was waiting to be tapped began to pass an excessive quantity of urine, and her distress subsided. The fluid passed was albumenized serum, with cholesterine plates. After six months the woman died from a sudden outburst of hæmoptysis. A large empty cyst was found lying, collapsed and loose, in the belly ; it had thick walls, and included some lesser cysts. A good-sized staff passed with the greatest facility from the cyst along one of the Fallopian tubes into the uterus and vagina. The supposed urine did not come from the bladder, but was cystic fluid which escaped by the tube, uterus, and vagina.

We may conclude then, that tubo-ovarian cysts may be formed : 1. By the establishment of a communication between an ovarian cyst and the Fallopian tube, the outer end of which dilates to form one cavity with the opened ovarian cyst ; 2. By the bursting of a Graafian follicle, diseased or healthy, under circumstances which provoke peritonitis and the formation of adhesions uniting the fimbriated extremity of the tube to the ovary, the communication with the Graafian sac being maintained or not ; 3. It is possible that a tubo-ovarian cyst may be formed in a different way from the two preceding. The tube may be distended with pus or other irritating matter, which set up inflammation, and give rise to plastic effusions binding the fimbriated extremity to the surface of the ovary. Most frequently the matter escapes into the peritoneal cavity, and the peritonitis is widely diffused ; but it may be wholly or in great part surrounded by the rapid throwing out of plastic matter, which forms a cyst of the kind described.

The characteristic of these cases is their rapid formation under symptoms of ovaritis or peritonitis following upon sudden escape of ovarian fluid by the vagina, where there had previously existed a tumour, or symptoms of acute ovaritis or peritonitis with rapidly-forming swelling.

Cysts from development of wandering ova.—That ova impregnated, and especially non-impregnated, occasionally fall into the abdominal cavity, not being caught by the Fallopian tube, there is every reason to believe. When discussing the pathology of retro-uterine hæmatocele, and of extra-uterine gestation, this accident will be again referred to. In this place it is only necessary to refer to an hypothesis of Boinet, that ova which have gone astray in this manner may give rise to cystic growths:—" May not," he asks, " that happen for the formation of cysts of the ovary, which happens for fecundated vesicles? These are sometimes developed in the ovary itself, or in the Fallopian tube, or in the peritoneum, constituting abnormal gestations. May it not, then, happen that the non-fecundated ovum, diseased through causes referred to, may be pathologically developed either in the ovary where it remains fixed, or in the tube which it has reached, as at the moment of fecundation, or lastly in the peritoneum, into which it has fallen?"

Lloyd Roberts has published a case which illustrates Boinet's view. He removed a cyst by gastrotomy, which, after drawing off 17½ lb. of clear fluid of 1004 sp. gr., weighed 6 ounces. It was thin, homogeneous, highly vascular. It had no connexion with the ovaries or their appendages. These were quite normal. He concluded that this was a stray ovum.

CUTANEOUS PILIFEROUS CYSTS; OR, DERMOID CYSTS OF THE OVARY.

Lebert gives the name of " dermoid cysts " to those structures, either in newly-formed or in pre-existing spaces, which show on the inner surface of a sac new formations, whose identity with the structures of the skin is unmistakeable, as bone, cartilage, teeth, and hair. Tumours of this kind are not very uncommon in connexion with the uterine appendages. They call for careful clinical study in relation to ovarian tumours, to ectopic gestation, to retro-uterine hæmatocele, and other pelvic tumours.

The walls vary in thickness. The inner surface is either smooth, or in places there are prominences. The superficial layer of the inner surface consists of thick layers of pavement-epithelium. Indeed, elements representing all those of skin are found. Hair, fat-glands, sweat-glands, are recognizable; so that along with hair we find the contents of the cyst to be a yellowish, fatty unguent, made up of free fat, cast-off pavement-epithelial cells, and cholesterine crystals, which sometimes distinctly glisten. The general likeness of the interior of the cysts to skin had been often noticed. Kohlrausch demonstrated it.

It was at one time thought that these dermoid cysts were the result of an incomplete fructification of an ovum. But Baillie found them in children who had never menstruated; they have even been found in males. Anatomists now generally agree that they are quite independent of conception.

Brain-matter has been discovered in cysts of this kind by Gray, Chalice, Friedreichs, and Rokitansky. Friedreichs even found recently-formed strong cords of broad nervous branches, and unipolar and bipolar pigmented ganglionic cells. Virchow has seen a similar case; and he has also described muscular fibres. Bone is sometimes developed. It is found in small scales or lamellæ in the areolar tissues beneath the skin-formation. These, as they grow larger, acquire the most extraordinary shapes, with branches and spicula. The osseous structure itself is that of genuine bone, the Haversian canals and bone-cells being arranged in lamellæ. This formation of bones may easily impose upon the observer the conclusion that he has to deal with an ectopic gestation. But a case recorded by Velpeau* suggests caution in this respect, and also that there is still obscurity hanging over the origin of these tumours. "A young man, aged 20, was admitted into the Charité with a tumour the size of a fist connected with the testicle. It had existed from birth. It contained several bones and parts of a fœtus. It was embedded in the testicle."

A case recorded by Hulke (*Path. Trans.*, 1873) suggested to Wilks that these cysts may be infectious, like cartilage when associated with malignant growths. In Hulke's case there was cancer of the uterus, a large dermoid cyst full of hair surrounded by several smaller cysts of the same kind, connected with the uterine appendages, and several similar cysts, withered, attached to the under surface of the liver. Hulke tells me he thinks all the cysts were old and congenital.

This formative power is well illustrated in a case, presented (*Path. Trans.*, vol. viii.) by the late Mr. Moore. The abdomen was larger than at full period of gestation. An opening formed near the navel, and discharged pus. The opening was enlarged, and about seven pounds of stuff like putty was removed. Vomiting came on, and the patient died. There was one vast cyst adherent at every part of its surface, except near the bladder. The wall was tough, in part cretaceous. It contained hair and perfectly-formed teeth. Left ovary not discovered. Among the peritoneal adhesions were many small cysts, some of which were attached by slender pedicles to the main cyst, whilst others were entirely unconnected with it, but like it contained soft, cheesy, yellow epithelium, mixed with hairs. But although the formative power is usually obstinate and persistent, the course of these tumours is, for the most part, slow, extending over many years.

In the living body the fat exists in the fluid state. Thus there is a specimen in Guy's Museum (No. 2237^{20}) which, when opened, poured forth fluid fat, which immediately solidified. In another specimen (No. 2235) the fat was wholly soluble in ether. The hairs were imbedded in the usual way in the sheaths; and abundant, large, well-formed sebaceous follicles opened into the hair tubes.

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* "Archives gén. de Médecine," 1840.

Mr. Wood exhibited a tumour containing hair and fat, which melted readily on being exposed to heat equal to that of the body. (*Path. Trans.*, vol. x.) Dr. Hare mentioned another case where solid fat was found in an ovarian cyst after death, but which melted at 85°. (*Path. Trans.*, vol. iv.) In 1874 I drew off by aspirator-trocar, from a cyst behind the uterus, 16 oz. of liquid fat, which set as solid fat when cool. Hair was afterwards extracted.

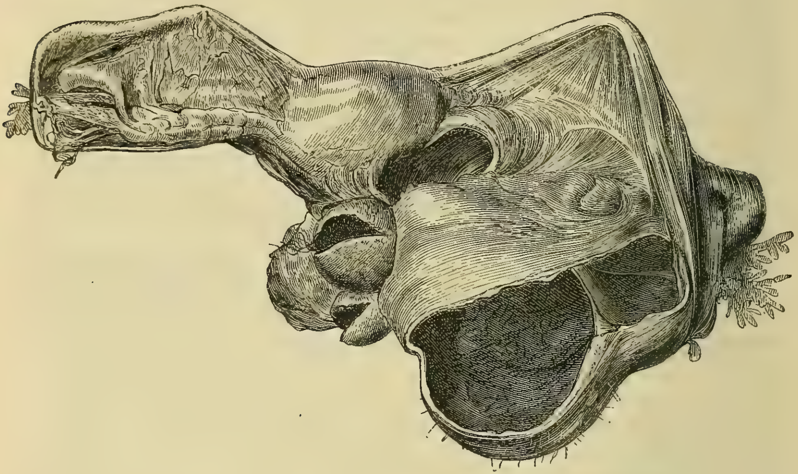

Fig. 80.—(Half-size.) From specimen in St. Thomas's Hospital Museum.
A DERMOID CYST OF THE OVARY (R. B.).

Ramsbotham (*Path. Trans.*, vol. iv.) describes a case of labour obstructed by a tumour in Douglas's space. The tumour was punctured by a long trocar through the vagina; a large teacupful of thick, yellowish matter, like thick custard, was collected; it became solid when cool, and consisted of fat globules. The tumour before puncture felt quite solid, no doubt from tension. Two cases, quoted from Ingleby, gave the same characters.

In St. George's Hospital Reports (1877) I have described a case similar to Ramsbotham's, as well as other cases illustrating the diagnosis and history of these tumours. I have little doubt that hair and teeth continue to be produced for years. Thus I have extracted tufts of hair at intervals during several years.

From the method employed I have been satisfied that no bones were left in the cysts after the explorations. And with regard to teeth Schnabel* found more than 100 teeth of all sorts, and

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* "Würtemburger Correspondenz-blatt," 1844.

Paget found 300. Some of these were probably loose, and therefore had been shed, the follicles producing new ones. Indeed, Meckel says these teeth are subject to the same laws as to duration and development as normal teeth, successive sets being produced.

The hair is usually, not invariably, pale or blonde. Andral found it so in a cyst from a negress. It may be that exposure to light is necessary to full pigmental development. In one case, that of an old woman, some of the hair was grey. (*Axel.*) In the lower animals, dermoid products after their kind are found. Thus, in sheep, wool; in birds, feathers; in cows, cow-hair, have been found. (*Lebert.*)

Dr. Gibbes* relates a remarkable case, in which labour being terminated by the forceps on account of syncope, the patient was harassed by the most intractable after-pains. A tumour was discovered above and behind the pubes, distinct from the uterus, and moveable. On a subsequent day this tumour was felt *per vaginam* in the anterior cul-de-sac. It then increased rapidly to the size of the largest shaddock; and it was considered necessary to remove it. This was done, as by the operation for ovariotomy. It grew from the left broad ligament. About three inches of the Fallopian tube were included in the ligature. The cyst contained pus and a mass of fine black hair. Menstruation occurred at several successive monthly periods through the wound. The patient ultimately recovered.

Cysts of dermoid character have been found in combination with serous or colloid cysts in the same ovary. (*Lebert*).

These tumours do not grow exclusively in the ovaries. Both kinds, says Paget, may be regarded as diseases of the same general group with the cutaneous proliferous cysts. The great formative power which they manifest is consistent with their occurring only in embryonic life, and in the ovaries, in which, even independently of impregnation, one discovers so many signs of great capacity of development.

A case interesting in its clinical as well as in scientific relations is recorded by Mr. Knowsley Thornton.† He tapped a very large abdominal tumour. Eighty-six pints of fluid looking like pus flowed; then fatty matter came mixed with little brown balls; next the canula got blocked from the fat solidifying in it and in the tumour under the influence of cold and the injection of carbolic acid. Hot-water bags and injection of hot water melted the mass, and the flow was resumed. The woman died in three weeks. The tumour came from the right ovary. The balls were glomeruli formed of short red hairs matted with cholesterine-scales, epithelium, and fatty matter. The tumour had been diagnosed after her first labour thirty-four years before her death, and she had been tapped nine years. The case shows three points: the long duration of these cysts; the great size occasionally attained; the solidification of the fatty contents under cold, and the practical lesson to keep the tumour and instruments warm during tapping. In one of my cases the trocar got blocked from the fat solidifying; it ran again when the instrument was well warmed. Occasionally the fluid as it runs out of a tapped cyst resembles gruel.

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* "Amer. Journ. of Med. Sc.," 1869.

† "Pathological Transactions,' 1876.

When these cysts are of ovarian origin the *symptoms* they produce are generally similar to those which attend other ovarian growths. They spring from the same seat; they extend in a similar manner. But they differ in several respects. Their rate of growth is usually much slower. They often date from an earlier age. They are mostly more solid and irregular in shape. Fluctuation is rarely so distinct; this symptom is not often developed, except as the result of suppuration or accumulation of fat. Dermoid cysts rarely attain so large a size as the dropsical tumours do. They more commonly terminate by setting up inflammation between some part of their walls and neighbouring structures, and in this way effect communications with the hollow organs, as the intestinal canal, or the bladder, or else they form fistulous openings externally through the abdominal wall. In all these respects they more resemble the abdominal cases of extra-uterine gestation. For these indeed they are often mistaken. Like them they are apt to contract adhesions with the viscera amongst which they are imbedded.

It is rare, however, that this formation of fistulous outlets is attended by a cure. It is undoubtedly an attempt at elimination, but one which is only partially successful. If the attempt is towards the surface, the wall of the tumour forms adhesions with the abdominal wall; inflammation attacks the skin, an erysipelatous blush appears; the skin is thickened, tender; fluctuation appears; an abscess points and bursts, if it be not opened by the surgeon. The elected seat is often near the umbilicus on one side. Nothing but pus may be discharged; the swelling undergoes little diminution; suppuration goes on; the signs of hectic or irritative fever set in. Sometimes masses of hair, matted together, and quantities of fatty matter, may be present and be dragged out from the opening. This may go on for a long time, emaciation proceeding, and exhaustion ending in death. Teeth more commonly remain adhering to the walls of the cyst.

When these tumours form a communication with the bowel, the course of events is similar. Pus, mingled with hair, and occasionally a tooth, escape from time to time, producing attacks of severe pain. When a communication is made with the bladder, the most puzzling symptoms are apt to arise. Dysuria may harass the patient for years; generally cystitis supervenes, and sometimes attacks of retention of urine occur. When fatty matter or hairs make their escape, the diagnosis is clear, especially if a tumour be observed in one or other groin or at the pelvic brim. The cyst occasionally relieves itself partially at intervals, and then may be felt to diminish in size. The symptoms set up may be so severe, either by threatening life by acute inflammation or by obstruction to the bladder, or by exhaustion from irritative fever, that an operation for removal of the tumour may be indicated. The operation for extirpation must be conducted on the same principle as that for extirpating ordinary cystic tumours of the ovary. But to relieve the bladder it may sometimes be enough to dilate the urethra, and bring away the offending matters.

I have now under care with Dr. Crisp, of Chelsea, a case in which two fistulous openings have been formed near the umbilicus, and another into the bladder. At times urine or pus escapes by one of the abdominal fistulæ, and gelatinous pus by the bladder. The case was first seen by the late Dr. Ramsbotham more than twenty years ago. She has never been pregnant. The free external vents give her security.

In a considerable proportion of cases the termination is accelerated by pregnancy and labour. The pressure of the gravid uterus and of the child during labour injures the cyst, and disposes it to inflammation. But for the accident of pregnancy it may remain quiescent and unsuspected during life, to be discovered only on autopsy. Denman cites a fatal case. In St. George's Hospital Reports (1877) I have related several illustrative cases.

Treatment.—When there is evidence by pointing of working towards the surface, it is wise to open the abscess by a bistoury. This should be done cautiously, to a limited extent, in the first instance. The incision may be subsequently extended, perhaps crucially, and the cavity of the cyst explored by sound and finger. Tapping will detect fat. The sound will detect teeth; and the small hook (Fig. 81) will detect hair. In this way we may facilitate the evacuation of the contents. The cavity may be washed out with Condy's fluid, weak solution of iodine, or weak carbolic acid. Generally a fistulous opening remains for an indefinite time, leading to hectic fever. It is therefore desirable to make tentative incisions with a view to extirpation. The adhesions they are so apt to contract will, however, often frustrate the attempt. It might be justifiable to lightly cauterize the inner surface of the cyst with the galvanic cautery, to modify its character. It is scarcely probable that much inflammation would be excited in surrounding healthy structures, and when the sloughs had been discharged, the cyst deprived of its formative elements would contract and the fistulous opening close.

Since the generally elected seat of these tumours is the recto-uterine pouch, they can in most instances be attacked with the greatest advantage by the roof of the vagina, or through the rectum. The vagina is to be preferred. An exploratory opening may first be made with the aspirator-trocar, or with the modification of this instrument I have devised for the purpose. The cyst having been examined by the sound and its nature determined, it is better to enlarge the opening so as to give free vent to the fluid, hair, or teeth. The best way to do this is, the patient being in lithotomy-position, in anæsthesia, to open the cyst to the length of an inch or more by the thermo-cautery knife. Then a drainage-tube can be inserted, and the washing out is facilitated. From time to time we may estimate the size of the cyst by the sound, and by means of a small hook, made by bending the stilet of a catheter (Fig. 81), swept round inside the cyst, we are pretty sure to entangle any hair that may be in it. In this way I have frequently fished out tufts of hair.

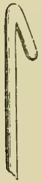

Fig. 81. (R. B.)

CHAPTER XIII.

ECTOPIC OR EXTRA-UTERINE GESTATION: TUBAL; OVARIAN; TUBO-OVARIAN; ABDOMINAL; INTERSTITIAL; CERVICAL; ONE-HORNED UTERINE GESTATION.

For clinical purposes it is convenient to study ectopic gestation in connexion with ovarian tumours. The diagnosis between them is often a pressing practical problem, upon the solution of which hangs the choice of the method of treatment.

Under the general term "Ectopic Gestation" I propose to include all gestations outside the cavity of the body of the uterus, the normal nidus of the impregnated ovum. The term "extra-uterine gestation" is defective and inaccurate. Gestation in the cervical canal is not strictly extra-uterine, but it is abnormal and ectopic. The same objection applies to the intramural gestations.

Ectopic gestations embrace 1. Tubal; 2. Ovarian; 3. Tubo-ovarian; 4. Abdominal; 5. Intra-mural; 6. Cervical.

1. *Tubal Gestation.*—Under various conditions the Fallopian tube may rupture or become perforated, when its contents suddenly thrown into the peritoneal cavity may cause shock, or peritonitis, and death. The best known of these conditions is the tubal form of extra-uterine gestation. The ovum may be arrested in any part of the tube. If caught in the fimbriæ, a sac is formed partly out of the dilated mouth of the tube, and partly by attachments to neighbouring structures, especially the ovary, thus forming the tubo-ovarian gestation. The sac in this case usually assumes a rounded shape. If the ovum be caught in the middle of the tube, the shape of the sac is more ovoid. It may be caught in the uterine portion of the tube, and the gestation is then called "interstitial" or "intramural." It may be said, generally, that the sac bursts the earlier the nearer its seat is to the uterus. Thus the tubo-ovarian sac may not burst until near the ordinary term of uterine gestation; whilst the tubal sac or the interstitial sac usually bursts at dates varying from six weeks to three months. Kiwisch saw a case

which burst at four weeks. Gestation may, however, go on for four, five, or even six months. Spiegelberg relates one case in which it went to term.

The tube, although consisting of a mucous and a muscular coat like the uterus, is ill adapted to keep pace in growth with the rapid development of the ovum. The adaptation is not simply, as in the case of uterine gestation, obtained by growth of the tube *pari passu* with its contents; the tube is stretched as well; and there comes a time when, the stretching exceeding the distensibility of the tube, the sac bursts, and the contents escape into the peritoneal cavity. Along with the ovum, or at least the embryo—for frequently the chorion remains attached to the sac—there almost invariably is poured out a large quantity of blood, which proceeds from the torn vessels of the tube. It is a form of abortion. There is partial detachment of the ovum and hæmorrhage from similar causes. Under the high tension of pregnancy exaggerated at the menstrual epochs, the vessels connecting the ovum to its sac give way, and blood-extravasation results. The greater danger is mainly due to there being no external outlet. The injury sustained is compound. There is the traumatic violence attending the rent, producing shock; and hæmorrhage, producing anæmia. The symptoms are also twofold. Shock induces collapse. There is sudden intense pain following on a sense of something having given way in the lower part of the abdomen. The immediate effects of the shock are coldness, prostration, near extinction of the pulse, vomiting; deadly pallor supervenes, and in a short time, often not exceeding a few hours, the patient dies. To this assemblage of symptoms I have given the name "Abdominal Collapse." It is distinguished from the collapse which attends sudden injury or ruptures in the head by the preservation of the mental faculties, and from the like injury in the chest by the absence of that terrible anxiety of respiration which marks the chest collapse. The symptoms, coming as they do suddenly and destroying a woman, who up to the moment of the attack was in the enjoyment of good health, have often given rise to the suspicion of foul play by poison or mechanical violence. If the patient survive the shock, and reaction set in, the signs of hæmorrhage become manifest; the anæmia is marked by the pallor of the body, the whiteness of the tongue, lips, and conjunctivæ, the hæmorrhagic pulse, the distension of the lower abdomen, and sometimes by semi-fluctuation in a mass behind the uterus in Douglas's pouch, constituting what I have ventured to call a "cataclysmic" form of retro-uterine hæmatocele. Again, at this stage the patient is likely to sink under the exhaustion of the shock and loss of blood combined. But if she survive this stage, she has still a third and formidable danger to encounter. This is peritonitis. It usually supervenes rapidly. A few hours' time is often enough to light up almost universal peritonitis. Intense pain continues, the patient can hardly bear the slightest touch or the weight of the bedclothes on the abdomen; the abdomen swells, becomes tense, the pulse is rapid and small, the temperature rises two or three degrees above the normal standard, the countenance puts on the anxious drawn expression characteristic of abdominal injury. Still the case may issue in recovery. The shock and hæmorrhage may be not greater than the patient can bear, and the inflammation may be limited to the pelvic peritoneum; plastic lymph may be so thrown out as to surround and encapsulate the blood-mass.

When called to a woman suffering from an injury of this kind, reference to her previous history for the purpose of diagnosis is but trifling in the presence of a great emergency. Nice diagnosis of the cause of the injury and source of the bleeding would afford little help in treatment. The present state of the sufferer demands all our care. Historical investigation may be postponed. This is far from saying it should be neglected. What we want is such a perfect knowledge of the nature and course of a disease—and this remark applies with especial force to the case under discussion—as will enable us to detect it in its incipient stages, to understand the changes that are in progress, and thus to acquire indications for treatment in anticipation of the disasters which attend the climax. The hints we get that a tubal pregnancy is going on are commonly so obscure that they are easily overlooked. The subject herself may feel no disturbance of health, or observe no sign so unusual, as to lead her to seek medical advice. She may be satisfied that she is pregnant in the ordinary way. The physician rarely indeed has the opportunity of studying these cases during their progress. He sees only the catastrophe. But phenomena sometimes present themselves, which, although not conclusive as to the existence of tubal gestation, are yet sufficiently important to dictate a careful local examination. I will not insist upon the suspension of menstruation, and the presence of the common subjective signs of pregnancy, further than to call to mind that if examination of the uterus lead to the conclusion, and this is not easy to arrive at, that the uterus is not the seat of the presumed pregnancy, we should consider the possibility of an extra-uterine pregnancy. One difficulty in gaining the first step in diagnosis—that, namely, of excluding uterine pregnancy—lies in the fact that the developmental force working in the tube extends to the uterus, causing considerable enlargement of this organ. Another obstacle is imposed by the hypothesis of pregnancy, which forbids the use of the uterine sound.

Two signs, singly or concurrently, justify exploration. These are pain and hæmorrhage. These signs, of course, are far more likely to be connected with ordinary abortion, some disease of the uterus, or with dysmenorrhœa. But this probability does not detract from the expediency of examining. On doing this we may be able to exclude uterine causes. This is one step. The next is to obtain evidence of abnormity outside the uterus. If we find fulness of the vaginal roof on one side of the uterine neck, the uterus pushed over to the opposite side, if we can, by finger in rectum, and hand depressing the abdominal wall above the pubes, define a swelling between them, the presumption rises that there is extra-uterine pregnancy. Tubal gestation is distinguished from encysted abscess of the broad ligament or pelvic peritoneum by its smoothness, uniformly round or oval form, and by its mobility. The long axis of the oval tumour is parallel with Poupart's ligament. The presumption of tubal gestation is strengthened in proportion as we increase the evidence of pregnancy. Thus Huguier says, the violaceous coloration of the vagina has always been to him an indication of pregnancy, uterine or extra-uterine. Vaginal pulsation may be felt. Evory Kennedy in one case detected the placental *souffle.** Analysis of numerous cases proves one thing, namely, that in many, perhaps in most, distinct symptoms which may be regarded as premonitory, do occur before the final catastrophe. The pain, Goupil says, is constant. It is due, no doubt, to the stretching of the tube chiefly, and in part to the pressure of the enlarging sac upon neighbouring structures. Kennedy's cases, my own,† and many others, show that pain occurs early and continues.

The hæmorrhage is not less constant. I have several times pointed this out in discussions at the Obstetrical Society. It strengthens the analogy with abortion. Goupil says, metrorrhagia is an almost constant phenomenon. Lesouef, in the most valuable monograph on extra-uterine gestation with which I am acquainted, declares that hæmorrhage is the initial fact of the fatal accidents, and that when the fœtal sac bursts, blood had already for a long time been poured into it distending its walls. Lesouef does not insist clearly upon the escape of blood externally in the form of metrorrhagia. But I believe this phenomenon is so frequent that it may be regarded as indicative of what is going on in the sac. The blood which flows by the vulva is to a certain extent the overflow. It no doubt postpones the climax in rupture. It should serve as a warning of the impending danger.

A point deserving of the most earnest attention is that in many cases the fatal catastrophe does not come in one single stroke. One or more minor attacks, evidently marked by rupture and effusion of blood, occur several days before the final blow is dealt. The symptoms of these preliminary strokes are those of hæmatocele. The first rupture is probably small, the ovum perhaps remains entire. If we could seize this moment to puncture the sac we might avert the fatal rupture.

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* "British Medical Journal," 1869.

† See "St. Thomas's Hospital Reports," vol. i., 1871, "Pelvic Hæmatocele."

Diagnosis—The physical signs taken alone might not enable us to distinguish an early tubal gestation from a small ovarian cyst or a tubal dropsy. But add to these physical signs, so similar in both cases, the history and signs of pregnancy, the pain and the hæmorrhage, and we get an accumulation of evidence which in some cases at least amounts to a very high degree of probability in favour of tubal gestation.

Three conditions there are which are most likely to be a source of difficulty. Retroversion of the gravid womb; a small ovarian cyst; retro-uterine hæmatocele. The first and third of these conditions will commonly cause retention of urine, an accident which seems comparatively rare in tubal gestation. In the first, almost constantly there is a history of pregnancy, and the characteristic signs of it; in the third also there may be a history of pregnancy. Retroversion may be distinguished by tracing the firm rounded body of the uterus by vaginal and rectal touch and by its other characteristic signs. Retro-uterine hæmatocele may be the result of abortion. It will, like tubal gestation, be attended by external hæmorrhages. But the mass of blood behind the uterus will have followed on severe symptoms suddenly produced, and the uterus will present a degree of development much less than that commonly observed in tubal pregnancy. Although a small ovarian cyst may also cause retention of urine, it does not cause suppression of menstruation. We may always negative pregnancy.

Lesouef cites a case in his Memoir (No. vi.) of an extra-uterine gestation mistaken for a retroversion of the womb at the fourth month. Puncture was made, and attempts at reduction. Two days later the fœtus passed by the rectum. There had been almost complete suppression of urine, and stoppage of fæces. The case was seen by Dupuytren, Antoine Dubois, Lisfranc, and Maygrier. I have also seen cases of gestation in Douglas's pouch which gave rise to the same symptoms and erroneous diagnosis. One is recorded in St. George's Reports, 1877.

Fig. 82 is a good illustration of a tubal gestation, the cyst bursting at about the third month. The uterine decidua is dissected up, and is remarkably developed. The tube is brought forward for the purpose of demonstration. In life it would get behind the uterus.

Causes of Tubal Gestation.—These are interesting, as illustrative of the morbid conditions to which the Fallopian tube is liable.

It is remarkable that, in a considerable majority of cases, it is the left tube which is the seat of gestation (*Campbell, Hecker*). This may possibly be explained by the fact that the left tube is more liable to displacement and compression by the sigmoid flexure, which lies in close relation to it, and is often disturbed by fæculent accumulations.

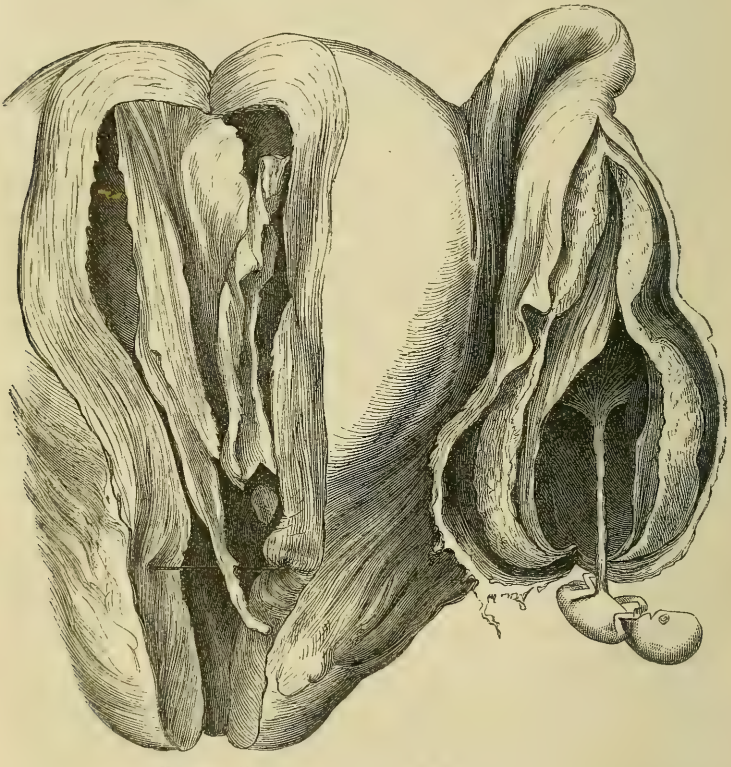

FIG. 82.—(St. Thomas's Museum, H. H. 19, nat. size.

GESTATION IN THE LEFT FALLOPIAN TUBE. THE SAC RUPTURED; THE EMBRYO SUSPENDED BY ITS CORD; THE UTERINE MUCOUS MEMBRANE DEVELOPED TO A THICK DECIDUA (R. B.).

The essential condition of tubal gestation is obviously arrest of the impregnated ovum in the tube. We have, therefore, to consider what are the conditions which may lead to this arrest? Naturally we look to some mechanical obstruction, and in some cases this is found. Amongst these are—

a. Inflammatory adhesions.—Hecker* believes this to be a common cause. He supports this opinion by eight dissections, showing adhesions impeding the free course and connexion of the tubes with the ovaries; by the fact of the frequent sterility antecedent to tubal gestation; by the well-known sterility of prostitutes which follows upon colic—the *colica scortorum.* It has been remarked, that in many instances the subjects of tubal gestation had, up to the time of such gestation, been sterile. There is sufficient reason to admit this as a frequent cause, but many cases are known in which the course of the tubes appeared to be free; and in some cases, in which adhesions have been found, these were probably not antecedent to, but the consequence of, the tubal gestation.

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* "Monatsschrift für Geburtskunde," 1859.

b. Obstruction of the ostium uterinum by polypi.—Breslau* relates two cases in which polypi were found at the uterine end of the tube. In one, that of a woman, aged thirty, who died of abdominal hæmorrhage six months after marriage, a cyst, containing chorion and blood, occupied the left tube. The cyst was close to the uterine mouth of the tube. Inside the uterus, close to the mouth of the tube, was a mucous polypus, not quite obstructing the passage of a small sound.

This position of polypus is not very uncommon. I dissected a uterus in which a polypus the size of a filbert was attached to the mouth of each tube and occluded it.

Fibrous tumours in the uterus have been found in several cases. A very interesting one is related† by Dr. Magrath, of Jamaica. In University College Museum is a specimen (No. 4275) of tubal gestation, the sac having burst at the fifth month. The uterus contained several large fibroids. These tumours so distort the form and relations of the uterus, that obstruction to the passage of the ovum may readily occur. Extra-uterine gestation, then, may be looked upon as one of the penalties a woman having fibroid tumours in the uterus may incur if she marries.

It has struck me as remarkable, how often, in tubal gestation, twins have been found. May it not be that the two ova may obstruct each other in their passage along the tube?

c. Another fact deserves notice. In the great majority of cases of extra-uterine gestation, the subjects have been women *exposed to hard work.* In many cases the women themselves have assigned this as the cause of their misfortune. It is quite possible that great bodily exertion during the first days after conception may so alter the relative position of the ovaries, tubes, and uterus, as to impede the due transit of the ovum; or great congestion of the organs may be induced, causing tumefaction of the mucous membrane. Coste conjectured that shock, moral or physical, might cause extra-uterine gestation.

d. Oldham was, I believe, the first to observe that occasionally the corpus luteum was found in the ovary of one side whilst the ovum was developed in the tube of the opposite side. How could this contradiction be explained? The ovum must have travelled by an unusual route. The problem has given rise to the theory of the *transmigration of the ovum.* This theory offers two routes which the ovum may take.

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* "Monatsschrift für Geburtskunde," 1863.

† "Obstetrical Transactions."

The extra-uterine transmigration.—Oldham and Wharton Jones found, in a left interstitial gestation, the corpus luteum in the right ovary; the right pavilion was obliterated, and both observers believed that this obliteration was of old date, so that the ovum could not have passed by it. The uterine portion of the left tube was drawn towards the posterior wall of the uterus by false ligaments, which were also found at the far extremity of this pavilion, which was thus brought into contact with the right ovary, and had directly received the ovum from it.

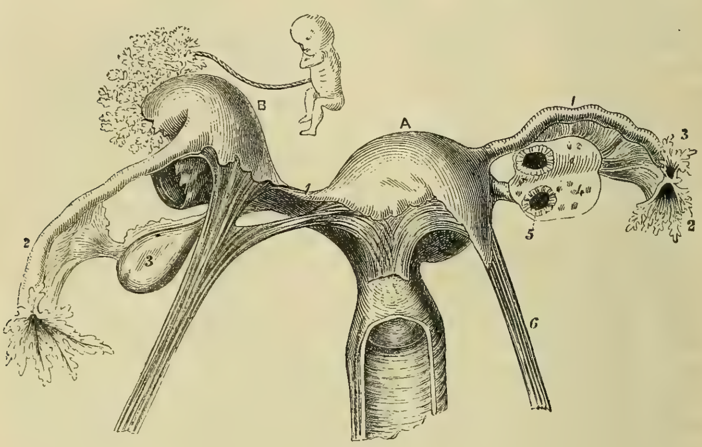

Fig. 83.

GESTATION IN A RUDIMENTARY HORN OF THE UTERUS—FRONT VIEW—(AFTER LUSCHKA).

A, the developed horn of the uterus (right); B, the rudimentary horn with a rent, through which the fœtus has escaped (left). 1, the Fallopian tube (right); 2, the Fallopian tube (left); 4, 5, right ovary and corpus luteum; 6, round ligament.

Rokitansky found in a woman, who had died after a uterine pregnancy, the yellow body on the left; the abdominal portion of the left tube, for a space of two inches, was thinned, impervious, its pavilion adherent to the sigmoid flexure above the brim of the pelvis; the right tube was mobile. He believes that the conception took place after these adhesions had been formed, and that the ovum had passed into the uterus from the left ovary by the right tube.

In these two cases, then, it seems difficult to avoid the conclusion that the fertile ovum travelled from its ovary to the opposite tube. Klob and Kussmaul showed, what any one may see on the dead body, how easily the fimbriated extremity of the right tube may be applied to the surface of the left ovary, and *vice versâ.* But Kussmaul does not regard this contact as necessary. He invokes observations made on amphibia, in which it is certain that actual contact between tube and ovary does not take place. And Müller and Becker have described a *vibratile current* running from the ovary to the tube, which may sweep the ovum over the intermediate space into the tubes. Maurer's case is another illustration of the extra-uterine transmigration.

A case that seems decisive as to the possibility of the extra-uterine transmigration, is related by Luschka.* A woman died under the usual signs of rupture of a fruit-sac when about ten weeks pregnant. It was found that the fruit-sac was in the rudimentary horn of a one-horned uterus, whilst the corpus luteum was in the opposite ovary. No communication could be found between the sac of the rudimentary horn and the cavity of the developed half of the uterus, so that intra-uterine migration is necessarily excluded in this case. It is convenient to give Luschka's figure here; the reader can refer to it when studying the subject of pregnancy in a rudimentary horn further on (Fig. 83).

In several other cases in which the corpus luteum was found in the ovary of the same side as the fruit-sac, the rudimentary horn containing it had no communication with the cavity of the developed horn. Here we may conjecture that the spermatozoa found their way through the developed horn and its tube, being thus conveyed across outside the uterus to the ovary of the opposite side; unless, indeed, we conclude that, at the time of the conception, a communication between the cavities of the two horns did exist, which became closed during gestation.

Schultze† relates a case of a tubo-uterine gestation, carried to term. The gestation was on the right side, the corpus luteum on the left. The right tube was impervious at both ends. This would appear a case of extra-uterine transmigration.

In the London Hospital Museum (E. h. 28) is a specimen in point. It exhibits the uterus and ovaries of a woman who died very suddenly, and was suspected to be poisoned. There is a tubular conception and ruptured sac on the left side; the corpus luteum is on the opposite side. Indeed, cases of this kind appear to be not very uncommon.

Mr. Stirling, of the Edinburgh University, informed me (1875) that in eight out of twenty sheep the ovum was found in the opposite horn to the corpus luteum; and that in five out of twenty sheep a double corpus luteum with only one lamb was found.

The intra-uterine transmigration.—Tyler Smith, I believe it was, who started the hypothesis that the ovum might be received into its appropriate tube, enter the uterus, cross the cavity, and penetrate the opposite tube, where it might become developed.

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* "Schwangerschaft i. d. rechten rudimentären Horne," &c., M. f. G., 1863.

† "Würzburger Med. Zeitschrift," Band iv.

There are facts which support this idea. That the ovum does wander in the uterine cavity is proved by the cases of placenta prævia, where the ovum gets to the cervical zone, and also in some rare cases even into the cervical cavity, constituting cervical gestation. Klob,* however, disputes the possibility of intra-uterine migration.

But it must be remembered that in a considerable proportion of cases of tubal gestation, the corpus luteum is on the same side as the embryonic sac, and that no obstruction by adhesions or tumours can be found. Here we may suppose that a temporary flexion of the tube may present a spur or valve at some point on the uterine side of the ovum and block its onward course.

I will now describe what I believe is the exact order and course of events in the greater number of cases of tubal gestation. The ovum is impregnated either in the ovary, as Coste thought probable, or after its reception in the tube. Arrested there, it grows, developing its chorion into placenta, and distending the walls of the tube into a sac, until the time arrives—seldom postponed beyond three months—when the growth of the ovum outstrips the growth and stretching of the tube which contains it. The great majority of cases terminate in rupture within eight weeks (*Hecker*). Dr. Roper observed that the rupture occurred at a menstrual period. This increases the analogy I have pointed out between tubal gestation and placenta prævia and abortion. The tube does not burst at once; if it did there would be no premonitory hæmorrhage. This hæmorrhage I account for on the same hypothesis as that by which it seems to me certain that the hæmorrhage in placenta prævia is explained. In both cases the gestation is *ectopic*, that is, proceeding in an abnormal locality which is unfit for the office imposed upon it. The Fallopian tube, like the lower segment of the uterine cavity, has only a limited capacity of growth. This is soon overtaken by the growing ovum, which, not finding the room it requires, excites spasmodic contractions of the sac. Hence partial detachment of the ovum is caused, and some hæmorrhage ensues. In the case of tubal gestation, partial detachment is very easy, owing to the scanty development of decidua. This hæmorrhage, in cases both of placenta prævia and of tubal gestation, may escape externally. In the first case, the os uteri offers a ready exit; in the second case, the exit is not so easy, and the sac is comparatively feeble. Hence a large proportion of the blood poured out by the severance of relation between placenta and sac is retained in the sac. The distension becomes extreme. Renewed spasmodic action of the muscular wall is excited, and the sac bursts. The ovum itself does not always burst, and, probably, rarely does until the sac has done so. The accumulated blood in the tube, together with fresh blood proceeding from the torn vessels of the tube, is now poured into the abdominal cavity, causing the shock and other phenomena that mark the climax.

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* "Wochenblatt d. Ztschr. d. k. k , Ges. d. A. in Wien," 1861.

The influence of extra-uterine gestation upon the uterus is an important point to consider. The remark of Velpeau that the sexual organs show little departure from their ordinary state when the fœtal sac is not in the tube, and do not contract adhesions with the uterus, is generally true. But in every museum which can show specimens of tubal gestation will be found ample evidence of enlargement of the uterus, and of the development of the mucous membrane into decidua; and this is entirely in accordance with physiological knowledge. The uterine mucous membrane swells and undergoes development into decidua under the mere stimulus of ovulation. This development is a necessary preparation for the reception of the ovum. It is not a necessary condition for its formation that the ovum should reach the uterus. But why, it may be asked, is the decidua so constantly found in tubal gestation preserved so long as three months when it is not wanted? And why is it not observed in many cases of abdominal gestation? The explanation is found in the remark, before cited, of Velpeau. In tubal gestation, the engorgement of the uterus and the physiological stimulus are maintained by the proximity of the fœtal sac; whilst in abdominal gestation the developmental stimulus and the vascular system supplying the sac are remote from the uterus. Still, in many cases where the sac adheres to the uterus and presses upon it, this organ is greatly enlarged, and its mucous membrane is highly developed. As to the formation of decidua in the tube itself, it might be, *à priori*, supposed that the tube having a mucous membrane, and the physiological necessity for a decidua being present, a decidua would be formed. But Oldham,[*] Kiwisch, and Virchow have shown that it is not so. The mucous membrane in the tube is deficient in the utricular glands which the uterine membrane possesses. A careful examination of specimens confirms Virchow's observation. The chorion-villi seem to be implanted directly upon the mucous membrane. The condition of the mucous membrane of the tube has been investigated by Poppel,[†] who says that even if a decidua vera be formed, there is certainly no serotina. Hennig has also studied the question.[‡] He shows greater similarity between the behaviour of the uterine and tubal mucous membranes under gestation than was before suspected. If, he adds, there be no serotina in tubal gestation, the placenta is developed on a different plan to that of the normal uterine placenta; it is developed according to the plan which governs the normal gestation in rabbits, cats, and dogs.

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[*] "Guy's Hospital Reports," 1843.

[†] "Monatsschrift für Geburtskunde," vol. xxxi.

[‡] Ibid, 1869.

This slender attachment may serve to explain the facility with which separation and hæmorrhage takes place. Also, in abdominal gestation, there is no true decidua in the sac. The placenta is attached directly to the surface of the uterus or of some abdominal organ.

The Treatment.—A careful study of the history, course, and premonitory symptoms of tubal gestation, will encourage the hope that we may in some cases at least avert the ultimate catastrophe. In the early stages, before hæmorrhage has occurred, if pain and local distress have led to an examination, and the detection of fulness in the vaginal roof a little on one side of the uterus, which we conclude to be, on grounds described under "Diagnosis," due to a tubal cyst, we have, I think, a sufficient indication to act decisively. Lesouef said that every woman who has become the subject of an extra-uterine gestation, is doomed to more or less speedy death. This is eminently true of tubal gestation. Error of diagnosis is the only justifiable ground for hesitation. And for what is a tubal gestation likely to be mistaken? Most likely for a small ovarian cyst. Now here is a case of which we have many analogous examples in medicine. Whichever view be right, the same treatment applies; and hence the error entails no harm. The indication in both cases is to arrest the growth of the cyst.

This can be done by *tapping* it; and tapping through the vagina or rectum by means of the fine aspirator-trocar is infinitely less dangerous than letting the disease go on to its ordinary and almost inevitable termination.

In the case of tubal gestation, there being no available outlet, we are precluded from the induction of labour. But the embryo may be killed, and thus the development of the sac cut short.

Electricity.—Dr. Bacchetti* described a case in which two needles were passed into the tubal sac, and then a current of electricity was passed through by means of a Bunsen's pile. Two shocks were administered. The growth of the tumour was arrested, and the patient did well. Of course it may be doubted whether there was really a tubal gestation; but in any case it is proved that the puncture may be safely made. Duchenne, consulted by Lesouef, suggested resort to electricity in the state of tension by a Leyden jar. He ascertained that the discharge of a Leyden jar produced a profound local stupor, and that for a certain time the capillary circulation and calorification were diminished in the tissues operated on. The method he recommends is, to cover the stem of the excitors with a thick coating of wax, leaving only the terminal ball bare. One excitor is then passed into the rectum, endeavouring to place it in contact with the postero-superior side of the tumour. The lumbo-sacral plexus must be avoided, else the mother will receive the shock. The second excitor is passed into the vagina, and the ball is applied to the antero-inferior wall of the cyst. Thus arranged, the rectal excitor is put in communication with the external armature by a chain suitably isolated. It then only remains to bring the internal armature in contact with the vaginal stem by a glass stem excitor. The electricity will recompose itself across the fœtal cyst, and it seems inevitable that the stream must traverse the embryo.

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* "Gazzetta medica toscana," 1853.

This mode of applying electricity seems preferable to that of Bacchetti, inasmuch as no wound is inflicted. Indeed, Bacchetti's plan may be excluded on the ground that, having made the puncture, electricity is superfluous.

Drawing off the liquor amnii.—The sac deprived of this element will naturally collapse, the ovum will in all probability perish, and atrophy by absorption ensuing, cure will be attained. If the aspirator-trocar be used, the liquor amnii can be easily drained off.

It had already been proposed by Basedow to puncture the cyst through the vagina, to drain off the liquor amnii, and thus to kill the embryo. This method was advocated by Kiwisch* who recommended to pass a small trocar into the cyst by the vagina.

Professor Friedreich † of Heidelberg relates a most interesting case in which, having detected a tubal cyst which gave rise to great pain, and was increasing so rapidly that bursting was apprehended, he made three *injections of a solution of morphia* into the cyst. He based this proceeding on the known susceptibility of the infant organism to opium. Complete success followed. The tumour shrank to a small hard knot, and all the distressing symptoms vanished. It is not, however, clear whether the same result might not have been obtained by the punctures alone, the morphia injections being superfluous. Some degree of inflammation is pretty sure to follow puncture. This would entail the death of the fœtus. But the necessary drainage of the cyst would alone be efficient.

Dr. Greenhalgh ‡ describes a case in which he arrested the development of a tubal gestation by puncture through the vagina. Professor E. Martin § relates a case in which he pursued the same method.

The late Professor Simpson || related a case in which a patient who had suffered rupture of an extra-uterine cyst was punctured by the vagina "to evacuate the liquor amnii, to effect death of fœtus and subsequent decomposition and expulsion." Death occurred through peritonitis. The sac was formed by the enlarged uterus, broad ligaments, pelvic walls, and sigmoid flexure. The fœtus was of six months' development. Thomas relates a most instructive case.* A woman had suffered several acute paroxysms of pain in the left iliac fossa. The uterus measured three and a half inches from os externum to fundus; it was in right oblique anteversion, and not so moveable as normal; to the left of the uterus was a tense elastic cyst which filled the whole iliac fossa, pressing the uterus to the right, and extending down to a little below the level of the os internum. He detected *ballottement* in this cyst, and diagnosed tubal gestation. He opened the cyst through the vaginal roof by the galvano-cautery knife. A straw-coloured, slightly-coloured pinkish fluid was ejected with such force as to fly into the operator's face. A finger passed into the cyst felt a fœtus. This was extracted. Severe hæmorrhage attended extraction of the placenta. He thereupon injected a solution of persulphate of iron into the cyst. The bleeding was instantly checked; but a bit of placenta was left behind. Septicæmia ensued; but under repeated injections of carbolized water subsided. The bit of placenta came away on the fifteenth day. The patient recovered. The fœtus measured six and a half inches.

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* "Klinische Vorträge," Prag. 1849. 11 Abtheilung. S. 275.
† "Virchow's Archiv." 29, 1863.
‡ "Lancet," 1867.
§ "Monatsschrift für Geburtskunde," 1868.
|| "Edinburgh Medical Journal," 1864.

The proceeding is worthy of adoption. It may, however, be doubted whether it would not be better to leave the placenta for gradual elimination, keeping open the communication of the cyst with the vagina.

Dr. Rupin† relates a case of twin-pregnancy outside the uterus. A cyst was felt projecting in the roof of the vagina, which was punctured, and liquor amnii drained off; a fœtus of four months escaped. The patient died of violent hæmorrhage three days afterwards. On autopsy, a second fœtus was found in a sac deep in the pelvis. Probably this was not a tubal gestation.

Can we arrest embryonic growth by means of agents introduced into the blood?

M. Delfraysse‡ relates instances of retardation of the growth of the fœtus by continued doses of iodine. Many attempts in ancient and modern times have been made by starvation and drugs to accomplish this object. I do not insist upon them, because I have no faith in their efficacy. It is possible, however, that *strychnine* carried so far as to produce minor toxical symptoms in the mother, might destroy the embryo. Syphilis has more power than almost any poison we are acquainted with over the fœtus, almost always either killing it, or impeding its development. Might it not be justifiable in such a case as we are discussing to practise syphilization? I do not dwell upon this repulsive method, because I believe simple puncture of the sac is the right course to adopt.

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* "New York Medical Journal," 1875.

† "Gazette des Hôpitaux," 1860.

‡ "Comptes rendus de l'Académie des Sciences," 1850.

If the opportunity of treatment during development has been passed by, and *rupture has taken place,* what is the course to be adopted?

The question is often discussed, whether it is not advisable to perform *laparotomy* (λαπάρα, the soft part between ribs and hips, *abdominal section*) with a view to removing the embryo and effused blood, to check bleeding by tying the Fallopian tube on the proximal side of the sac, and cutting away the sac? I do not imagine that this will be successfully carried out in cases of early tubal rupture. In the first place, the greater number of subjects die within a few hours from the primary shock of the injury and hæmorrhage. Laparotomy must add to this shock, and cannot restore the lost blood. Secondly, to discover the source of the bleeding, and to remove the blood is by no means easy. I have found considerable difficulty in tracing the parts with all the advantages incident to a post-mortem examination. Thirdly, if we could tie the tube, and amputate the sac, the pain caused by the ligature might by itself exhaust the vital power. I fear the actual state of science has no resource beyond the old one of rallying the patient from collapse by cautious administration of stimulants, of procuring rest by opium, and by controlling inflammation, if the patient survives until this conservative process sets in. If this fortunate event should be reached, the case may resolve itself into one of encysted pelvic hæmatocele, and must be treated on the principles laid down for that condition.

But this issue by cataclysmic rupture is not invariable. I agree with Lesouef's observation that extra-uterine gestation is a far more frequent accident than is supposed, and that if it be so rarely observed, it is because the embryo in the greatest number of cases is destroyed in the first days of its development. No appreciable symptom then is manifested, or if the physician is called in, it is impossible for him to refer what he sees to its true cause. When a tubal, ovarian, or abdominal gestation is brought to an end in the first days, the hæmorrhage may not be fatal, and the rational signs of gestation not having yet appeared, the source of the resulting hæmatocele escapes detection. In these cases the hæmorrhage may escape from the surface of the tube or from its open end. There is not necessarily rupture of the tube; but the embryo perishes, and a hæmatocele is formed. I have related cases, upon my interpretation of which of course it is easy for criticism to cast a doubt, but which I nevertheless believe to be of this nature. In yet another order of cases, rupture of the tubal sac takes place early, the hæmorrhage is not fatal, and the impregnated ovum escaping into the abdominal cavity may graft itself upon the peritoneum, when a sac will be formed by false membranes.

Lesouef, quoting Bernutz, says:—"If the rupture of the tubal sac takes place on a level with the attached border of the tube, the blood will find its way into the cellular tissue of the broad ligament, and thus find difficulty in effusion, whilst the ovum will insinuate itself in the route made between the folds of the broad ligament, and become developed there. For it must be remembered that the ovum itself rarely ruptures, its envelopes remain intact, and its vitality is not necessarily destroyed."

The *tubal gestation may go on to term.* This issue is exceedingly rare; so rare, that a case which Spiegelberg* relates he believes to be singular. Convulsions came on in a woman at term, with signs of labour; copious albumen was found in the urine. She died after three days, the convulsions and albuminuria having ceased on the death of the child. The cause of death was perforation of the sac. Examination showed that the sac was tubal; a sound passed from the uterus into it; muscular fibres were found over the surface; the sac was enclosed between the two layers of the broad ligament; the ovary was found entire. I am unwilling to hint a doubt of the accuracy of so excellent an observer as Spiegelberg; but it appears possible, even in this case, that there had been at an early stage rupture of the tube at its lower margin, which had given opportunity for the ovum to extend its sac by opening up a space between the folds of the broad ligament.

The question of performing laparotomy to extract a fœtus developed outside the uterus will be more conveniently discussed after the description of the other forms of extra-uterine gestation.

2. *Ovarian Gestation.*—The reality of this form has been doubted. Velpeau and Arthur Farre especially contend for the negative. The reasons adduced are two-fold: 1st, the physiological one, which is based upon the assumption that the ovum must have escaped from the ovary before it can be impregnated; 2nd, the anatomical one. It is urged that there is no clear evidence of a fœtus or fœtal membranes having been discovered in the ovary. Professor A. Willigk† advocates this view, and criticises the alleged cases. He has carefully dissected several, and failed to find fœtus or membranes in the ovary. It is needless to say that the microscope is necessary to identify presumed chorion-villi.

On the other hand, there are cases which it is hypercritical to set aside as being imperfectly observed. And the physiological objection falls to the ground if we accept the conclusion of Bischoff and Coste that impregnation does take place in the ovary. Thus Duverney[*] relates a case given by De Saint-Morissey, of a lady who, pregnant for the ninth time, at three months fell ill with collapse from severe colic in the right groin. She died in nine or ten hours. The abdomen was full of clots, and a small fœtus was found in the midst. The right ovary was torn longitudinally, and in the half of the side not attached to the tube its whole capacity was filled with clots. Every one present was satisfied that this was the spot where the fœtus had been formed.

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* "Archiv. f. Gynäkologie," 1870.

† "Prag. Vjhrtschr.," lxviii.

Goupil cites a case from Ucelli. The uterus was enlarged.

Drs. P. U. Walter[†] and Hecker[‡] relate cases in confirmation.

A case is related by Uhde[§] of a young woman who died under the usual signs of "abdominal collapse." Blood was found in the peritoneum. The right ovary was enlarged and emphysematous; at its lower and hinder part was a sac formed of chorion, which had burst. It was the size of a large plum, and contained an embryo 7‴ to 8‴ long. The right tube was hanging quite free, its fimbriæ loose. The preparation is preserved, and affords a good means of testing the reality of ovarian gestation.

It is, *primâ facie,* unphilosophical to affirm an absolute negative. It is, then, wise to admit that ovarian gestation may happen, but safe to affirm that it is very rare. During life it would be difficult, if not impossible, to diagnose it from tubal gestation. If detected before rupture, it would be right to treat it by puncture in the same way, for the histories of the few cases narrated show that the ovarian sac, like the tubal one, is apt to burst early. Probably a more frequent issue is the merging into the tubo-ovarian or abdominal forms.

3. The *tubo-ovarian* form is not very infrequent. Probably its history commences with arrest and development of the ovum just within the fringes of the pavilion of the tube, so that this structure supplies part of the sac, the rest being made up by adhesions contracted with the ovary. It may also arise from original tubal gestation, early rupture of the tubal sac, and fusion of this with the surface of the ovary by adhesions. The occurrence of signs of pelvic inflammation at some period in the history of these cases supports the probability of this event. The tubo-ovarian gestation, like the abdominal form, differs from the tubal by the greater probability of the gestation going on to the full development of the fœtus. What then happens will be considered under "Abdominal Gestation."

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[*] "Œuvres Anatomiques," 171.

[†] "Monatsschrift für Geburtskunde," 1861.

[‡] Ibid., 1859.

[§] Ibid., 1857.

4. *Abdominal Gestation.*—It appears to me doubtful whether abdominal gestation is ever primary, that is, whether the impregnated ovum attaches itself *ab initio* to some part of the peritoneum. It can scarcely be doubted that ova, impregnated or not, frequently are missed by the *morsus diaboli,* and fall into the abdominal cavity, there to perish. Kiwisch insists that spermatozoa also find their way into the peritoneum, and may there meet the stray ovum, and give rise to primary abdominal gestation. Such a fortuitous concourse of atoms resulting in gestation, rests at present on conjecture. Probably, then, abdominal gestation is always secondary upon tubal or ovarian gestation. After these latter forms have proceeded a little way, the sac, as we have seen, gives way, but the ovum is not cast out of its original habitat; it maintains its vitality by retaining part of its original attachments. Inflammation of the peritoneum is excited by the rupture and effusion of blood; neighbouring organs get connected by adhesions with the sac; the embryo and its envelopes grow into the new space; fresh effusions of lymph are thrown out surrounding all; and thus a new sac is formed, in which it is difficult to trace the original tubal structure. It is only when the opportunity occurs of dissecting the parts at an early stage of gestation, that we can expect to unravel the structures involved in the sac. No long time elapses without the complication of inflammation and false membranes implicating neighbouring organs, whilst possibly a process of atrophy of the original structures forming the cyst has altogether confounded analysis. That the original gestation may be ovarian and not tubal seems proved by a case related by the late Dr. Dyce, of Aberdeen. A woman died after having carried an abdominal gestation eight years, and having had two uterine pregnancies in the meanwhile. *Both Fallopian tubes were found entire,* but no trace of one ovary could be detected.

The course of abdominal gestation observed may be like that of ordinary gestation up to a certain point. But intercurrent attacks of pain, the expression probably of attacks of peritonitis, are apt to occur. 1. The *cyst may burst,* as in a case related by Dr. Thormann (*Wien. Med. Wochnschr.,* 1853). The cyst projected into the retro-uterine pouch, and under expulsive efforts it burst through a rent in the posterior wall of the vagina, an arm of the fœtus protruding.

2. In most cases, however, the cyst is too tough to burst. After labour-pains have persisted for some time, *the fœtus dies.*

3. Death may happen through *exhaustion under the efforts at labour,* and from compression of the fœtus upon the abdominal organs.

4. The *peritonitis* may prove fatal, and the cause may escape detection unless a post-mortem examination be made. Peritonitis may be the result of rupture or perforation of the sac,

and it may precede or follow the death of the fœtus. In one case of this kind which I have related* a fluctuating swelling was formed behind the uterus. The uterus was driven forwards and above the symphysis pubis, and considerably elongated, I believe, by the pressure to which it had thus long been subjected. The absence of uterine pregnancy was first established by the uterine sound, and by dilating the cervix to facilitate exploration of the interior. Then the swelling behind the uterus was punctured. Fluid in part resembling liquor amnii escaped. Death was caused by the peritonitis. In most cases, probably, the sac will encroach upon the pelvic cavity, getting behind the uterus. The sound will isolate the uterus; the finger exploring by vagina and rectum will detect the fluctuating mass, perhaps make out parts of the fœtus, or fœtal bones. There may, however, be no fluctuation, the mass being solid from absorption of the liquor amnii, or from presence of coagulated blood. Sometimes when perforation, spontaneous or surgical, has been made, the discharge is characteristic. It is a sort of blood-stained putrilage, and may reveal shreds of disintegrated fœtal tissue.

5. In many cases the sac-walls being formed in part by some portion of the alimentary canal or the abdominal wall, or at least only separated from these by adhesions, a process of *ulcerative absorption* takes place, by which a fistulous *perforation is made into the intestines, or through the abdominal wall.* This process is attended by hectic or irritative fever and emaciation. It is rarely that the opening thus made is large enough to permit the easy or complete evacuation of the fœtus. The attempt at elimination is a long, tedious, and exhausting process, under which the patient commonly sinks.

When such an opening is formed through the abdominal wall, it is advisable to enlarge it by incision with a bistoury, or the cautery-knife, so as to give free exit to the remains of the fœtus, which should even be extracted by the fingers or forceps. The opening may be safely dilated to the necessary extent for this purpose, because the sac will almost certainly have contracted large adhesions for some distance around.

In the case of pointing and *perforation into the rectum* taking place, a similar course should be pursued; but the extension of the opening must be more limited. In either case, during the voiding of the fœtal bones, and after they have been all collected, if an offensive discharge continue, the cavity of the sac may be washed out from time to time by injecting a solution of iodine, permanganate of potash or carbolic acid.

Occasionally, but less frequently, elimination takes place by *the bladder.* In this case it may become necessary to dilate the urethra, which is easily done, so as to admit the finger or a lithotomy forceps, to facilitate removal of bones.

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* "St. Thomas's Hospital Reports," 1871.

Another issue of abdominal and tubo-ovarian gestation is the *carrying to term*, when signs of labour supervene. The phenomenon offers points of remarkable physiological and clinical interest. It ought to throw considerable light upon the vexed problem—What is the cause of labour? If unmistakeable labour-effort occur when the fœtus is enclosed in a sac quite independent of the womb, we are entitled to exclude the womb as the primary seat of the cause of labour. And, as we cannot ascribe to the artificial womb in which the fœtus happens to be contained, greater virtue than the natural womb possesses, we are driven to conclude that the primary cause of labour lies in the fœtus, unless we imagine some power resident in the mother. But this last hypothesis seems difficult to admit. I rather incline to the opinion that when the fœtus has attained its full development, when its organs are prepared for external life, some change takes place in its circulation which involves a correlative disturbance in the maternal circulation which excites the attempt at labour. Sometimes, even, a sanguineous show takes place from the vagina.

The seat of the labour-pains is not even clear in these cases. Velpeau believed the seat of the contractions to be the fœtal cyst. If the cyst be formed by the Fallopian tube, its muscular wall may be so developed as to possess true contractile power. The same remark applies if the sac be developed between the layers of the broad ligament. Dézeimeris thought the contraction was in the uterus, which in tubal cases at least is sufficiently developed. In a tubo-ovarian case which had passed into the abdominal form, the constitution of which I investigated with Dr. Hall Davis and Dr. Cayley, abundant smooth muscular fibres were found in the walls of the sac.

Whenever the sac takes its origin in or involves the tube, broad ligament, or ovary, we may expect to find muscular fibres in its walls.

Whatever the initial cause of labour, the attempt is necessarily abortive. The pains subside, notwithstanding all the help derived from a duly irritable nervous centre, excited by impressions emanating from the fœtus or its sac, and often vigorously seconded by emotional and voluntary actions. Under these the sac may burst. Perhaps the attempt is renewed at several intervals.

Treatment.—What is the best course to pursue? It is not necessary to say, that in the first place, accurate knowledge should be obtained as to the state of the uterus. Is it certain the uterus has no concern in the pregnancy? It is proper, I think, in all cases, to dilate the cervix, so as to permit full exploration of the cavity. And this exploration should be especially circumspect and deliberate, for although we may be sure that the cavity so examined is empty and has nothing to do with the pregnancy, the uterus may be double; the unexplored cavity may contain the fœtus; or the gestation may be interstitial; that is, in one horn of the uterus.

The fœtus dies in many cases probably of asphyxia; in others from hæmorrhage into the placenta. Large clots were found in the placenta by Koeberlé.*

Supposing that we are able to exclude all forms of uterine gestation, ought we to undertake to deliver, and how shall we do it? It will help us to answer this question if we examine the results that may occur if nothing be done. The fœtus dies, the vascular system which was brought into activity for its support becomes atrophied; the sac assumes the character of an inert mass; the system accommodates itself more or less to the burden, and things may go on for an indefinite time. There are instances of women having carried an extra-uterine gestation for forty, even fifty years, ultimately dying of independent disease or old age. The sac may become calcareous, or retain its soft structure; but it is almost always found intimately adherent to abdominal viscera. The fœtus may undergo one of several changes; for several years the fleshy part may be preserved, the skin retaining much of its original character, and the muscles also. The surface, however, is generally converted into adipocere. After a further time, the soft tissues having first undergone this fatty metamorphosis, break down, leaving the bones bare. These next become separated. The cyst-walls inflame and suppurate, and a fistulous communication is opened with the exterior of the body, or with the bowels.

If the attempt at elimination be towards the surface by the abdominal wall, the skin becomes red, a tumour forms which becomes fluctuating; there is, in fact, an abscess which will burst if it be not opened. Considerable irritative fever attends the process; pus escapes from the opening at first, and it may be long before any part of a fœtus is recognized. A probe should be introduced to feel for solid substances; and the opening should be enlarged by the bistoury to permit the freer exit of the bones. Every bone should be carefully preserved to reconstruct the skeleton if possible, and thus to satisfy ourselves as to the progress of the case.

If the attempt be made by the bowel, commonly some distress in defæcation arises, perhaps obstruction of the bowel, then sanguineous discharge or dysenteric symptoms. Pelvic inflammatory symptoms attend. If examination be made by the rectum, a projecting tumour may be felt, and through its walls we may make out solid bones. If this be clearly established, it is advisable to puncture the sac at once by a bistoury or cautery knife, and to aid the exit of the bones by fingers or forceps. There is a great advantage in the vaginal elimination, if a sufficiently free opening be made. The drainage is more easy and perfect. There is a greater tendency to contraction and obliteration. Access for observation, injection, and extraction of bones is more easy.

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* "Des Grossesses extra-utérines et plus spécialement de leur traitement par la gastrotomie," by Keller. 1872.

Or, in other cases, the fœtus undergoes a calcareous metamorphosis. This seems the change most compatible with long life of the mother. There is a specimen in St. Thomas's Museum, for which I am indebted to Mr. R. W. Watkins, of Towcester. The fœtus had been retained for forty-three years. It is an admirable specimen of "Lithopædion," or conversion of the fœtus into stone. (*Obstet. Trans.*, vol. viii.)

But this conversion of the fœtus into a harmless mass must be regarded as a rare and fortunate accident. Various circumstances may arise to disturb the tranquillity of the sac, light up inflammation, and bring about dangerous, even fatal changes. A not uncommon circumstance thus acting, is a subsequent uterine pregnancy. The enlarged uterus may press upon the fœtal sac, and thus mischief may arise even during pregnancy. But the period of labour is especially perilous. During the expulsion of the uterine child, the extra-uterine sac is exposed to damage. The sac may be fixed low down near the pelvic brim, and be a direct obstacle to labour. Accordingly, the histories of many cases show, that a supervening uterine labour has kindled the dormant mischief, and caused death. Cases are however known, in which women, carrying an extra-uterine fœtus, have gone through a second and even several labours. They rarely escape in the long run. The danger is so great that it ought to influence our course of action.

I have stated my opinion that rupture of a tubal gestation-sac is not necessarily fatal. The blood effused may fall into the retro-uterine pouch, become segregated there, whilst the remains of the sac, with or without the embryo, may be shut off from the general peritoneal cavity by plastic effusions, and shrivel up. This view is confirmed by a remarkable case published in the *Obstetrical Transactions*, 1864, by Dr. Haydon, the specimen being reported upon by Drs. Tyler Smith and Braxton Hicks. A young woman became pregnant, and was supposed to have aborted, but no fœtus was seen. She was at the time dangerously ill, and not expected to live. Four or five years later she again incurred the risk of pregnancy, and six months afterwards died under symptoms of internal abdominal rupture. A gestation-sac in the right tube had burst, and a fœtus of three months' development had escaped; and appended to the edge of the rent was a small irregular solid mass, which proved to be a small fœtus packed very tightly within a membrane. The conclusion drawn was that the patient had had two distinct tubal gestations; that the first ended in rupture and isolation with shrinking of the embryo; that the second, occurring some years afterwards, ended by fatal rupture of the sac six months after conception, the embryo having died three months before the rupture.

Diagnosis of Abdominal Gestation from Ovarian Tumour and Normal Gestation.—The recognition of freely fluctuating ovarian tumours is generally easy; but difficult when the tumour is for the most part solid. Ovarian tumours are occasionally irregular in shape, and present hard projections which, if the mind is occupied with the idea of pregnancy, are readily mistaken for fœtal limbs. After the utmost pains have been expended in order to arrive at a conclusion, an exploratory incision may offer the only satisfactory information.

As to the diagnosis of one form of extra-uterine gestation from another, Scanzoni declares that this is impossible during life. This must be taken with some qualification. The abdominal form at least may commonly be distinguished from the tubal by its greater development, by its longer history, and by its terminations.

The abdomen is generally less tense than in normal gestation; it is expanded transversely; the umbilicus is often strongly drawn in. If the fœtus is living its movements may be felt more distinctly, and are often more violent than in ordinary gestation. The placental *souffle* is said to be rarely heard. But Parry relates a case in which this sound was heard with unusual intensity by himself and Drs. Duer, Ellerslie Wallace, and Goodell, of Philadelphia.* The os uteri may feel like that of the pregnant uterus, the cervix being open. The body of the uterus is likely to be deflected to one side, and possibly fixed by adhesions. This fixing of the uterus, infinitely rare in uterine gestation, would raise a strong presumption in favour of extra-uterine gestation. In almost all these cases the uterus is elongated. This elongation and the direction imparted to the organ will be defined by the sound, if the circumstances seem to justify the use of this instrument. Or the sound in the bladder may aid in defining the position and size of the uterus.

When the fœtus is dead, the abdomen sinks; the breasts fall; the uterus resumes its ordinary state, remaining, however, somewhat above its normal length. The history will help. The subject will have been conscious of being pregnant. There will, probably, have been indications of peritonitis. Usually the liquor amnii is absorbed. But occasionally, as in a case related by Hutchinson,† and in one which I saw with Dr. Roper, fluid accumulates. If there is fluid enough in the cyst to permit of mobility of the fœtus, the fœtus may be felt to gravitate on putting the patient into the knee-elbow posture.

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* "Extra-uterine Pregnancy, its Causes," &c. By John S. Parry, M.D. Philadelphia, 1876. This work should be consulted for much valuable information and judicious discussion.

† "Lancet," 1873.

The question of *treatment* has to be discussed under four different aspects.

1st. Under the condition of early rupture, laparotomy might, as in the case of tubal gestation, be resorted to with a view to stopping the hæmorrhage. Velpeau, Duparcque, Kiwisch advised it. Koeberlé says he would not hesitate to do it.

2nd. When the stage of danger of rupture has passed; that is, after the fourth month.

3rd. When labour supervenes at term.

4th. When labour has passed over and the child is dead.

2. What is to be done during the life of the child? Shall we wait, pursuing simply an expectant course, or shall we take means to kill the child, so as to stop the developmental stimulus, trusting to the reduction of the sac, to isolation from the general system, and atrophy? or shall we resort to abdominal section, or other sure way of opening the fœtal cyst so as to extract the child? The decision is extremely difficult. During the developmental stimulus, the sac and surrounding structures are full of blood. To make incisions into them at this time, or even to puncture them is attended with serious danger from hæmorrhage. If the opportunity of tapping the sac at an early date has gone by, I think it will be better not to disturb the sac until the full term of pregnancy has arrived, when labour-effort is present, or when we know the child is dead. In one case* Dr. B. Hicks having felt a fœtus of about three and a-half months in a cyst between the rectum and the vagina, tried to destroy it by passing a strong galvanic current through it. Although the fœtal movements ceased during the administration, the embryo survived. A month later Dr. Hicks passed a small trocar into it. On the fourth day the patient died under symptoms of internal hæmorrhage. Two pints of fluid blood were found in the peritoneum. Duchenne's plan of giving a shock from a Leyden jar might have answered better.

3. What is to be done when the natural term of gestation arrives, the child being alive? New dangers now arise. The cyst may burst. There is renewed danger of hæmorrhage, and of peritonitis. And, not seldom, accidents follow quickly on the death of the child. The cyst has on several occasions burst during the early days following false labour, and acute peritonitis has proved fatal. To obviate these dangers, Levret advised laparotomy. So did Gardien, saying the placenta might be left. Velpeau and Kiwisch also advised it. Keller, who represents the opinions of Koeberlé, is in favour of the proceeding. He cites nine cases in which this, the primary operation,

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* "Obstetrical Transactions," 1866.

was performed, seven children and four mothers being saved. He narrates eight other cases, in which the operation might have been performed with advantage, the opportunity being lost.

It must, however, be remembered that in a large proportion of cases the labour subsides, the dead child is tolerated, and for a time at least the mother goes on without serious distress. It is true another phase of danger succeeds, but the period for this may be remote. Looking first to the mother's safety, I think we must decide that this is best attained by not resorting to any operation to remove the child. The rule of action may be expressed as follows:—If the labour-symptoms subside without sign of grave injury or hæmorrhage, do not interfere. If, on the other hand, there arise evidence of severe injury, causing shock, peritonitis, or exhaustion, open the abdomen and remove the fœtus.

A weighty objection against opening the sac to remove the child whilst alive or recently dead, rests on the uncertainty as to the nature of the sac. In some abdominal cases it can hardly be said that a true sac with defined walls exists; the placenta may adhere directly to the back of the uterus, to the surface of the intestines, even partly to the kidney, or, as in a case of Koeberlé, to the anterior abdominal wall, so that it was divided in the incision necessarily made to open the cyst. It may be almost impossible to cut down upon the fœtus without disturbing attachments to such an extent as to produce hæmorrhage that would probably be fatal. The case differs essentially from that of the Cæsarian section. In laparotomy for extra-uterine gestation none of the favourable conditions proper to the Cæsarian section are present. The placenta is almost always much spread out, and sometimes very adherent. Moreover, if the extraction of the placenta were possible, would it be prudent to effect it? The placental insertion is not endowed with contractility as in uterine gestation; the maternal sinuses will remain gaping, and hæmorrhage will be great. This objection to laparotomy whilst the child is living, loses some of its force if the attachments of the placenta are religiously respected, as the greater number of operators have understood the necessity for doing. The elimination of the placenta is then effected slowly, and the maternal vessels have time to contract and to become obliterated.

The most serious dangers of laparotomy performed at term are those which the elimination of the after-birth may provoke, that is to say, secondary hæmorrhage, peritonitis, and septicæmia. But are these as great and real as they appear at first sight? In the first place the peritoneum is not always opened; the cyst has contracted adhesions with the abdominal walls. If an expectant plan be followed, if opium and perfect rest be employed, the vascularity of the sac and the organs connected with it gradually diminishes, menstruation returns, a degree of contraction takes place, and after a time probably further adhesions tend to complete the isolation. Still the patient's life may be said to be at the mercy of accidents, of which we may have no sufficient warning. The cyst may still rupture, or fatal peritonitis may ensue. If uterine pregnancy supervene the situation may quickly become critical.

4. If it be decided not to operate during labour, what is the alternative? Shall we operate soon after the child's death? If the mother is suffering, exhausted, in great pain, and adhesions be diagnosed, it may be wise to operate within a few days. The placenta soon ceases to be a source of much danger. Its circulation has ceased. The blood coagulates in its villosities as was observed by Koeberlé.

If we decide to wait, the patient should be kept under vigilant observation. We should be ready to act the moment any sign of rupture or shock occurs. When an eliminative process begins, the propriety of interfering is clear, especially if irritative fever set in. The seat for operative measures will commonly be indicated by the seat of the eliminative molimen. If there be pelvic distress, such as obstruction or irritation of the rectum, crowding the uterus forwards upon the bladder, causing retention of urine, with or without local inflammation, and if we can detect parts of the fœtus or a prominent fluctuating tumour between the rectum and the vagina, this is the place to select. An opening may be made first with a large trocar, and any fluid contents of the sac be allowed to drain off. A sound, or the finger introduced through the opening, may detect the fœtus or bones. Opportunity may first be afforded for the spontaneous evacuation of the fœtus piecemeal. If this does not proceed satisfactorily, no great time should be lost before enlarging the opening with a bistoury or by cautery-knife; and, if feasible, of extracting the fœtal parts by finger or forceps.

If the effort be directed to the abdominal wall, the usual signs of abscess mark the point selected. The most common places are the neighbourhood of the umbilicus, one or other flank about midway between the umbilicus and the anterior superior spinous process of the ilium, or a groin. In some cases a perforation may have taken place into the bowel or vagina, and there may also be eliminative effort towards the abdomen. The communication with the bowel may be at a point quite out of reach of examination by the rectum. In such cases the indication is to operate through the abdominal wall. It is not constant that an inflammatory process takes place between the sac and the abdominal wall. But there is almost universally increase of prominence at some part of the abdomen. If air get into the sac from the abdomen, and I suspect sometimes without, decomposition proceeds rapidly, putrefactive gases distend the tumour, suppuration proceeds; and we then get resonance over the projecting part of the tumour, and fluctuation at other parts. Probably pus may be discharged by the bowel. With these local symptoms there will be hectic marked by rigors, sweats, diarrhœa, perhaps vomiting, a quick weak pulse. When this concourse of symptoms is found, there can be no doubt as to the expediency of trying to relieve the patient. Extraction of the fœtus and giving issue to the offensive contents of the sac may save her life. There are many instances where this course has been successfully pursued.

Mr. Hutchinson* is of opinion that what may be called the *primary operation by abdominal section* should not be performed, but that the *secondary abdominal section, i.e.*, at a time remote from the death of the fœtus, when inflammation of the sac has occurred, is strongly indicated. Campbell, who collected eighty-five cases of extra-uterine gestation, showed that sixty-two recovered, whilst twenty-three died as a direct consequence of the abnormal pregnancy. Of the sixty-two in which recovery took place, in twenty-one the fœtus remained quiescent through life for periods varying from four to fifty-six years, and in the rest its removal had been effected by ulceration. In a not inconsiderable number of the latter, the natural processes had been materially assisted by the surgeon, as by extracting bones, enlarging the opening, and so forth.

At the same time it does not seem desirable absolutely to condemn the primary operation; still less the operation at a time remote from the death of the fœtus, even when no inflammatory or eliminative effort has presented itself. I do not think the risk of danger from subsequent uterine pregnancy is sufficiently weighed. At all events the subject of an extra-uterine gestation should be emphatically cautioned not to incur the risk of another pregnancy. In the event of this complication occurring, the case should be treated on the same principles as those laid down when discussing the treatment of ovarian tumours complicated with pregnancy.

Very eminent men have advised the primary operation. Thus Levret, Gardien, Velpeau, and Kiwisch urged it, and that at a time when abdominal surgery was imperfectly understood, when its dangers were really greater than now, and when they were thought to be even greater still. In recent times, Koeberlé, whose authority is especially to be valued on account of his great experience and success in ovariotomy and in laparotomy for extra-uterine gestation, pronounces himself decidedly in favour of the proceeding. Keller, after carefully weighing the arguments, for and against, decides in favour. He calls to mind that dangerous accidents may ensue quickly upon the child's death; that the cyst has on several occasions burst during the early days of false labour; and that hæmorrhage and peritonitis may quickly prove fatal.

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* "Medical Times and Gazette," 1860.

On the other hand, it must, I think, be admitted that the risks attending the primary operation are greater than those attending the secondary operation. Whilst the child is alive, the cyst and placenta are in the full vigour of vascular communication; the cyst has probably no contractile property; the placenta is likely to be widely diffused, its attachments projecting amongst intestines, perhaps deep in the pelvis; or it may, as occurred in a case operated upon by Koeberlé, grow to the anterior wall of the abdomen, so that it must necessarily be cut through by the incision made to open the cyst. The cyst itself has probably not formed extensive adhesions to the abdominal wall, so that incision will be likely to open the peritoneum. There will thus be greater danger of secondary hæmorrhage, of suppuration, of septicæmia, and of peritonitis. The question would be fairly stated as follows:—Are the dangers of the primary operation greater than those of the secondary operation, plus the dangers immediately and soon following the neglect to perform the primary operation? It is clear that the catastrophes, as rupture of the cyst, hæmorrhage, and peritonitis attending false labour, must be taken into account, and added to the dangers of the secondary operation. It is also right to throw into the same scale at least a certain proportion of the more remote dangers, as peritonitis, exhaustion from suppuration, subsequent uterine pregnancy, and so on, to which the woman is exposed.

The latest writer on this subject, Dr. J. S. Parry, after a careful analysis of the facts, condemns the primary operation. He shows that of 62 cases of abdominal section tabulated, 20 were performed at or before the end of the ninth month. Of these 14 died. Of 188 cases left to nature 99 died, or 17·35 per cent. less than if they had been subjected to laparotomy with the hope of saving the child. "In other words, nearly one out of every four mothers operated upon with the hope of saving her extra-uterine infant, dies, not from the terrible accident of which she is the victim, but from the knife of the surgeon, who is deluded into the idea that art is safer than nature." Add to this that the saving of the child, which must according to the imperative law be held a secondary duty to that of saving the mother, is at best problematical. Twelve children out of the 20 only survived, and some of these only for a brief period. Thus a main argument for the primary operation breaks down. The question may be summed up as follows: Absolute, universal truth does not rest with either side. Statistical evidence must not be accepted with unlimited confidence. Cases may arise in which the primary operation may be justified; others in which it may be wiser to temporize, to perform the secondary operation, or no operation at all. The second course will certainly apply to the majority of cases.

The operation of laparotomy to remove an extra-uterine fœtus.—The general preparations are the same as for the Cæsarian section; but there are important modifications in the execution.

The seat of the incision will generally be in the linea alba. It is, however, determined somewhat by the point of greatest prominence of the tumour, or by the position of the fœtus. A smaller incision is commonly necessary than for the Cæsarian section. The central point of pain and prominence is the most likely to be the centre of the adhesions formed between the sac and the abdominal wall. A longitudinal incision not exceeding two inches in length in the first instance, is then carried carefully through the abdominal wall, and a small opening is made in the sac. The finger is passed through this to feel for the limit of the adhesion, and guide the further extent and direction of the incision. This should be just large enough to permit the extraction of the fœtus; and it is better, if there be any difficulty in extracting the fœtus whole, to bring it away piecemeal, than to extend the opening much, lest we open the peritoneal cavity. If the cyst have not contracted adhesions with the abdominal wall, care will be necessary to prevent the protrusion of intestines and the escape of blood and other offending matters into the peritoneal cavity. To obviate this, the cyst, at the point where it opens into the peritoneum, should be stitched to the edges of the abdominal wound. Sometimes there is no proper cyst. The fœtus and placenta occupy a cavity made by displacement of the intestines. The *extraction of the fœtus* requires some obstetric skill to do it without unnecessarily increasing the opening or disturbing the sac. I have seen a surgeon pull at an arm as soon as the fœtus came in sight, and thus, not reflecting that he was really making a transverse presentation, fail to extract the fœtus through a liberal opening. It was delivered with perfect ease by Dr. Ramsbotham, who seized the feet, performing the equivalent of version.

The same consummate obstetrist, who had had considerable experience in cases of extra-uterine gestation, insisted upon the rule now generally adopted, of *not removing the placenta,* if it in any degree adhere. It is advisable to tie the funis, and let its end hang out of the wound. If omentum interfere, the obtruding bit may be cut off and the vessels tied, or the bit may be removed by cautery-clamp. Refrain from all curiosity as to the attachment of the placenta and other matters, if it cannot be indulged without disturbing the parts or extending the opening. If the placenta do not come away on gentle traction, leave it. In some cases it will already have melted down, and its remains will come away with the pus and other discharges. In other cases it softens and breaks down within a few days after the operation, and will come away in lumps or small *débris.* In other cases its attachments have yielded in a few days as the sac shrank, and it has come away entire. Marked improvement commonly follows the discharge of the placenta.

Where attempts have been made to remove the placenta or the cyst, the result has generally been disastrous, and that, whether the case were primary or secondary, whether the child were alive or dead. Mr. Clay, however, tells me that in a case in which he left the placenta, fatal hæmorrhage ensued.

The wound may be closed with two or three sutures, leaving a sufficient opening for the funis and ligatures, if any vessels had been tied. If discharge continues, the sac may be lightly washed out now and then with a solution of permanganate of potash or carbolic acid. In such a case, when the sac adheres throughout the extent of the opening, the operation is, as Mr. Hutchinson remarks, scarcely more serious than opening an abscess.

In the case of a *uterine gestation complicating an extra-uterine gestation,* at the time of labour, attempt first should be made to push aside the extra-uterine sac so as to permit the uterine child to pass through the pelvis. Should this manœuvre not be possible, we should not hesitate to remove the extra-uterine fœtus by laparotomy, and thus to allow delivery of the uterine fœtus *per vias naturales.*

Primary opening of the sac by caustics.—A case is related * of a woman who had carried an extra-uterine fœtus ten months. Blachet opened into the sac by five applications of caustic. No blood was lost; and the fœtus was extracted. The patient nearly lost her life from the bleeding which ensued on removing the placenta.

INTERSTITIAL OR INTRAMURAL GESTATION, GESTATION IN ONE HORN OF A TWO-HORNED UTERUS, AND GESTATION IN THE HORN OF A SINGLE-HORNED UTERUS.

It is convenient to discuss these conditions together. They approach each other so nearly in locality and other characters, that they hardly admit of distinct clinical demonstration. The seat of these varieties, lying between those of tubal gestation and uterine gestation, must also occasionally give rise to difficulty in discriminating them from the latter. I entertain little doubt that some cases of presumed "missed uterine labour," a part of whose history is the subsequent discharge of fœtal bones by the os uteri and vagina, were cases of interstitial gestation, or of gestation in one horn of a two-horned uterus. Ulrich* relates a case, which may admit of a double interpretation. The fœtus died at five months; discharge of placenta in pieces took place by vagina four months later, and then bones came by the same passage. A year after this, all escape of bones by vagina having ceased, bones passed *per anum*. The patient died exhausted. The uterus was found adherent to intestine; some bones were encapsuled in the wall of the intestine; a direct communication existed between uterus and intestine. The cavity of the uterus was empty. It was concluded that the pregnancy was uterine, and that the discharge of bones into the intestine was the result of a fistulous opening established from the uterus. The most unequivocal case of a dead fœtus long retained in utero is one that came under my care. A lady was sent to me from India with a presumed uterine tumour. At the term of a reputed ordinary pregnancy, labour set in and passed off without result. A year after this, assisted by Dr. Fancourt Barnes, I removed a fœtus piecemeal and placenta from the cavity of the uterus, by hand working in the cavity. The uterus slowly underwent involution, and the patient recovered.

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* "Gazette des Hôpitaux," 1856.

Ramsbotham prefers the term "parietal" to "interstitial." It is remarkable, that when gestation takes place in the uterine portion of the tube, the dilatation, as a rule, affects solely the space between the inner and outer openings. The reason, Kiwisch suggests, may lie in the circular disposition of the muscular fibres around these openings. The sac enlarges most freely in an outward direction, and forms a prominence with a broad basis on the side of the body of the uterus. It is surrounded by the uterine substance, which at first undergoes an eccentric hypertrophy, and later, as the sac grows rapidly, is stretched, thinned at its apex, and then bursts. Interstitial gestation may, says Rokitansky, in rare instances like tubal gestation, merge into abdominal gestation. As in gestation in a rudimentary horn, it is often impossible to trace an opening from the tube into the sac. This becomes obliterated on either side as the sac is developed. But a peculiar modification at times occurs. The uterine mouth of the pregnant portion of tube may be dilated, so that the sac expands into the uterine cavity, constituting *tubo-uterine gestation;* or the tubal mouth dilating, the sac enlarges in the direction of the tube constituting *interstitial tubal gestation.* The first variety may end in a normal labour, whilst the latter is likely to burst into the abdominal cavity.

The illustration of tubo-uterine or interstitial gestation, Fig. 84, is taken from Dr. Poppel.† A pluripara died suddenly under symptoms of abdominal collapse and internal bleeding.

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* "Monatsschrift für Geburtskunde," 1857.

† Ibid., 1868.

She had been unaware of her pregnancy. The uterus measured from fundus to os 18 centim., at its greatest width 13 centim. The right side of the fundus was more protuberant than the left, and showed at its hinder part two rents, through which were seen portions of placenta and a fœtus. The uterus opened longitudinally along its fore aspect, showing two cavities. The lower one (*a* in the Fig.) was clothed with a thick decidua.

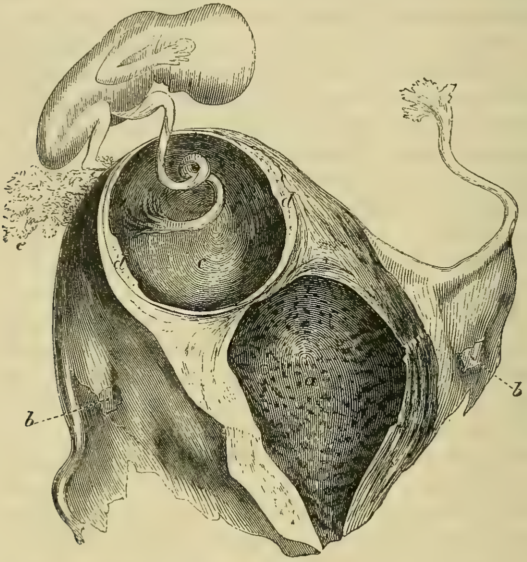

Fig. 84.—(One-third size.)

TUBO-UTERINE GESTATION—(AFTER POPPEL).

a, Cavity of uterus clothed with decidua. *b*, Broad ligament. *c*, Tubo-uterine sac which contained fœtus. *d*, *d*, Thicker part of walls of cyst. *e*, Placenta.

This was the proper uterine cavity. The upper cavity (*c*) was divided from the lower by a septum of muscular structure, all but a small opening of communication. It contained a fresh fœtus, which corresponded to the fifth month of gestation. At the point of rupture the wall of the sac was very attenuated, but at *d d* it was 1½ centim. thick.

Poppel discusses the difficulty of distinguishing these cases from gestation in a rudimentary horn. Baart de la Faille, who has written a careful memoir on the subject,* insists also on this difficulty. He says the characteristic distinction lies in this, that in the case of gestation in the rudimentary horn there is a muscular band of union between the uterus proper and the fruit-sac (compare Fig. 84 with Luschka's Fig. 83, p. 346), whilst in interstitial gestation there exists almost always a membranous septum with a larger or smaller communication, which is the original opening of the tube.

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* "Verhandeling over Graviditas tubo-uterina." Groningen, 1867.

Course and Terminations of Interstitial Gestation.—It is probably even more dangerous than the tubal form. Hecker collected twenty-six cases. The duration of gestation was generally less than three months. All terminated fatally. The ovum arrested in the uterine portion of the tube is developed there, forming its sac in the proper wall of the uterus; hence it is called *graviditas in uteri substantiâ.* It is just conceivable that an ovum so placed might grow, inducing a corresponding growth of the muscular wall which surrounds it, mutual adaptation proceeding, as in the case of an intramural fibroid tumour. A fibroid rarely bursts its investment as an ovum does, although Larcher relates a case in which the uterus ruptured with a fibroid tumour. This greater bursting force of the ovum is due to its quicker rate of growth, its greater vascularity, and its liability to sudden great accumulations of blood.

Cruveilhier, with that sagacity which enabled him to foreshadow if not to forestall so many discoveries made by more recent writers, carefully pointed out the distinction between these cases of bilocular uterus (*utérus cloisonné*) and the bifid uterus, and especially draws attention to pregnancy in these uteri in comparison with cases of extra-uterine pregnancy.

Gestation may take place in one half of an equally developed two-horned uterus. In this case things usually go on in the ordinary way, and labour is accomplished as in a normal uterus. Great perplexity may, however, arise during pregnancy and labour in determining the exact seat of the gestation. If the vagina is double, the exploring finger may pass up the empty side, and fail to touch the ovum. The same accident may happen when the septum dividing the two uteri extends to the roof of the vagina. Hæmorrhagic or catarrhal discharges may take place from the empty uterus, which may be erroneously referred to the pregnant one. Cruveilhier figures (Plate v., livraison xiii.) in his immortal work, a double uterus removed from a woman who died of puerperal fever. A septum divides the body from fundus to cervix into two cavities. Gestation had been carried on to term in one side. The empty side had grown to keep pace with the pregnant side.

Gestation in the Rudimentary Horn of a One-horned Uterus.—But, in not a few cases the horns of the uterus are unequally developed. One remains rudimentary. Pregnancy may take place in either. When it takes place in the larger horn, which represents the uterus proper, all may proceed as in the ordinary uterus. But it will be widely different if the rudimentary horn becomes the seat of gestation. The structure of this part is not adapted to accommodate the growing ovum.

Gestation may proceed to term in a one-horned uterus, as in the normal uterus. A most interesting case of this kind is recorded in the *Philosophical Transactions*, 1818. A woman had ten ordinary labours, and died after labour of twins. The preparation is figured by Granville. The right side of the uterus only was developed; the left side was wanting; the left ovary was very feebly developed; the left kidney was absent. Rokitansky relates two cases, and Chiari one of a similar kind. It is not improbable, however, that in the greater number of instances of development of one-half of the uterus only, there is sterility, whilst in others, pregnancy is ended by abortion.

Kussmaul has subjected this form of gestation to minute critical and anatomical analysis, and proves that it has often been mistaken for tubal gestation. He describes in detail twelve cases of this kind. The first is invested with unusual interest. It is taken from Dionis (1681). The subject was a lady attached to the court of Maria Theresa, who ordered Dionis to perform the autopsy, and made him show her the preparation. The lady died under signs of internal rupture when presumed to be five months pregnant. Kussmaul reproduces the figure given by Dionis. It represents very clearly a right-sided uterus unimpregnated, and a rudimentary left horn containing the fruit-sac, which had burst.

Other cases which Kussmaul's analysis restores to their proper significance are taken from Canestrini, Pfeffinger and Fritze, Tiedemann and Czihak, Joerg and Güntz, Drejer, Ingleby, Heyfelder, Rokitansky, Scanzoni, Behse, Ramsbotham, and one from the *Buffalo Medical Journal*, 1846. That of Luschka is the one I select for illustration (see Fig. 83, p. 346). Another preparation is preserved in the Heidelberg Museum, to which it was sent by Naegele. A woman, aged thirty-six, had borne four healthy children after easy labours. Pregnant the fifth time she suffered none of the symptoms she had experienced in former pregnancies, as nausea, vertigo, and so on; when, at the end of the fourteenth week, she was taken suddenly ill with acute pains in the lower abdomen, collapse, vomiting, expulsive efforts, and died in seven hours and a half. The right side of the abdomen was more enlarged than the left. The autopsy revealed a large quantity of blood in the abdomen; in the midst of it was found the embryo in its envelopes, and liquor amnii. The right horn of the uterus was the one that was developed, forming a *uterus unicornis dexter;* its cavity was lined with decidua; a distinct vaginal-portion could hardly be said to exist. From the left side of this right uterus, and close above the cervix, sprang a flat thick muscular band running to the left into a pear-shaped fruit-sac as big as a goose's egg. From the under circumference of this horn sprang close together the left round ligament, and the left Fallopian tube just beneath the seat of rupture of the sac. The left tube was quite pervious to a bristle throughout its course to its point of entry into the left horn, where it opened funnel-wise. It was as long as the right tube. The right tube was also pervious. The muscular wall of the sac was almost one inch thick at its connexion with the uterus, but became much thinner near the seat of rupture. The structure of the sac was that of a gravid uterus. Numerous wide vessels ran through the muscular wall, increasing in number and size as they approached the inner surface. The placenta clothed the entire cavity. The cord was attached near the rupture. The band which joined the left horn with the right one was muscular. The fœtus was well formed, female, about four ounces and three-quarters in weight, shrunken, and for the most part deprived of epidermis.

The thirteen cases collected by Kussmaul all terminated by rupture of the fruit-sac and death. The period of rupture varied from the fourth to the sixth month, the greater number bursting in the fifth month. One case, related by Rosenmüller,* burst at the end of five months. It thus appears that the rudimentary horn can carry on gestation somewhat longer than the Fallopian tube. The only instance of rupture so early as the tenth week that I know is Luschka's. It is remarkable that in several of these cases the subjects had borne children at term. It may be conjectured that the developed horn of the uterus was the seat of the successful gestations.

Kussmaul cites in detail a case described by Fritze (1779) in which gestation was carried on in the rudimentary horn of a uterus, which did not, as is usual, end by bursting of the fruit-sac. The embryo died in the fifth month, and dried up; the fruit-sac became confounded with the embryonic investments, and partly calcified. The contents underwent suppuration after thirty-one years, a result occasioned probably by the sharper projections of the bones produced by the progressive shrinking of the fœtus.

It is remarked as a curious fact that, in most of these cases, the sac formed in the rudimentary horn is found shut off from communication with the tube on the one side and with the uterus proper on the other. At the same time the corpus luteum is found on the same side as the gestation, the tube being pervious until it approaches the sac. The ovum therefore descended along its proper tube into the rudimentary horn. But how did the spermatozoa get to it? It has been conjectured that they travelled round by the opposite Fallopian tube through the intervening peritoneal space, and in at the abdominal end of the tube which admitted the ovum. I think it more likely that the spermatozoa do not pursue this vagrant circuitous route. At the time of impregnation I believe the passage from the developed uterus through the rudimentary horn is still open, permitting the meeting of the two elements in the usual way, and that the obliteration of the openings takes place during the development of the sac. There is confirmation of this view in the fact that in one case the passage was found pervious.

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* "Monatsschrift für Geburtskunde," 1862.

The accuracy of Kussmaul's interpretation of the specimens he has examined is, I think, beyond dispute. He proves that the fruit-sac in these cases is formed out of uterine structure; that the Fallopian tube has no share in it. One point only strikes me as being defectively described, that is, the constitution of the placenta, which is distinctly different in uterine and in tubal gestation. In the first, the decidual element is characteristic; whereas in the latter it is often scarcely to be distinguished. In future investigations this test should not escape attention.

Virchow supplies another test.* A woman died under symptoms of rupture. The preparation was at first taken for one of tubal gestation, until closer analysis was made. He proposed as a criterion between tubal gestation and gestation in a rudimentary horn the point of insertion of the round ligament. In the normal uterus this lies at the place where the Fallopian tube opens into the uterus. Now, if an ovum becomes developed near this place, the round ligament will be pushed either inwards or outwards; and thus we may know whether we have to deal with a tubal or a uterine gestation. If the round ligament is inserted on the inner side, the new cavity must be regarded as the tube: if it lie on the outside, the cavity must be uterine or a rudimentary horn. Tried by this test, it would appear that two cases figured by Kussmaul, as gestation in a rudimentary horn, are tubal (Cases IV. and VIII.). But, in reality, the gestation may have begun on the inside of the insertion of the round ligament, and in course of development have proceeded beyond this point.

The investigations of Kussmaul have been extended by the minute and accurate researches of Professor Turner.† He has subjected to dissection two specimens submitted to him by Sir James Simpson. In both of these, one horn was in a rudimentary condition, but impregnated.

Dr. Aveling calls my attention to the following very interesting case of *hernial gestation*:—In 1706, Gouey, of Rouen, saw a young lady for a tumour in the right groin. It grew rapidly, and without pain, and there was felt in it the pulsation of an artery. At the end of two months and a half the tumour was as large as a loaf of a pound weight. He laid it open, and found a hernial protrusion of peritoneum. Clear fluid escaped when this sac was opened. In another bag inside was a fœtus about six inches long, alive. This he removed, tying the cord. Drawing very gently upon the cord, the placenta came away. It was fastened to the circumference of the musculus obliquus externus. Gouey conjectures that the ovum impregnated grew to the round ligament, and came down through the ring in the canal of Nuck, and then grew in the hernial sac. Dr. Aveling supposes the gestation might have been uterine; and that it was an inguinal hernia of the gravid uterus. [From Sloan MSS., 4432, No. 45. "An extract from 5th part of a Book intituled 'La véritable Chirurgie établie sur l'expérience & la raison, par le Sieur Louis Leger de Gouey.' Printed at Roan, 1716, in 8vo., containing the account of a fœtus cut out of the groin, from the French by M.D"]

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* "Monatsschrift für Geburtskunde," 1860.

† On "Malformations of the Organs of Generation." Edinburgh, 1866.

CHAPTER XIV.

THE FALLOPIAN TUBES: ABSENCE OF; SEPARATION OF; INFLAMMATION (SALPINGITIS); CATARRH; HÆMORRHAGE; HÆMATOMA; OCCLUSION, CYSTIC DILATATIONS; DROPSY; FIBROID TUMOURS; TUBERCLE; CANCER—BROAD LIGAMENTS: CYSTS; TERMINAL TUBAL; PAROVARIAN; FIBROID TUMOURS; PHLEBOLITHES.

The pathology of the Fallopian tubes and of the broad ligaments has the most intimate clinical connexions with the history of ovarian disease. It will therefore be most useful to take it in this place. That part of it which concerns tubal gestation has been described in the preceding chapter.

The pathology of the Fallopian tubes deserves more attention than it has commonly received. The natural issue of some of the diseases of this structure is in sudden death; and this catastrophe may in some cases be averted by timely treatment.

Absence of: The tube of one side may be wanting if the corresponding side of the uterus is wanting. In many cases the tube is represented by an impervious string. In some cases there is only seen a small rounded stump attached to the horn of the uterus. This last condition, says Rokitansky, is mostly the result of a twisting and *separation* of the tube.

As conditions of *excessive development,* we sometimes see supernumerary fimbriæ, and accessory openings into the abdominal cavity. Appended to the fimbriated extremity is often found a small clear pyriform vesicle hanging by a peritoneal stalk, the remains of a pinched-off portion of a Wolffian duct.

The tube may undergo *elongation* to a greater or less extent through dragging of the uterus, as in prolapsus; or upwards, as when enlarged by fibroid tumours. But the most marked elongation is produced by the dragging of an ovarian tumour. In this case the whole tube becomes hypertrophied, its canal is widened, especially towards its fimbriated extremity, which sometimes stretches out, grasping a large surface of the tumour. Sometimes the stretching of the tube produces a marked thinning at one part, which undergoes atrophy and even breach of continuity.

The tube is liable to *inflammation—salpingitis*—and suppuration, independently of childbed. This may extend from the uterine cavity; and this, according to Scanzoni, is its common origin. But it may arise in, and be confined to, the tube. Aran relates a case of suppuration of both ovaries and tubes, supervening on menstrual disturbance, without metritis. When suppuration occurs, the collection of pus produces similar effects upon the form of the tube as other fluids. It does not escape readily by either end, but, being retained and accumulating, forms a cylindrical, somewhat tortuous, dilatation of the middle part of the tube. Then comes the special danger attending distension. The tube may burst, or be perforated, and offending matter, in sufficient quantity to irritate the peritoneum, suddenly escapes into the abdominal cavity. Peritonitis may result from salpingitis in three ways: 1, by extension of inflammation through the fimbriated end; 2, through perforation of the tube; 3, through pouring of pus through the open end.

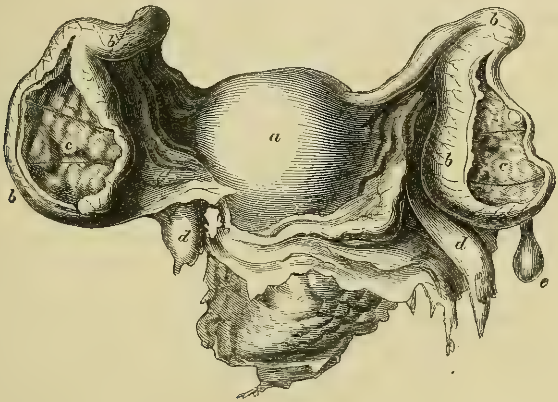

Fig. 85.—(Half size.)

INFLAMMATION OF THE FALLOPIAN TUBES—(AFTER HOOPER).

a. Uterus. *b b.* Tubes. *c c.* Saccular dilatations laid open.
d d. Round ligaments. *e.* A terminal vesicle.

The physical signs will be the same as those of dropsy of the tube. There will be similar fluctuating, bent, cylindrical rolls felt behind Poupart's ligament, and in the vaginal roof. The diagnosis is very important, because this condition must fall under the same rule of treatment by puncture as other affections of the tube, namely, tubal gestation and dropsy.

Fig. 85, after Hooper, is a good illustration of inflammation of both tubes. It shows the immediate effects of acute inflammation of the mucous membrane. The peritoneal investment is very vascular. The substance of the tube is much thickened and softened, and dilated into a sac. The mucous surface is covered with a flocculent albuminous layer. A quantity of fluid albumen escaped when the sac was opened. The fimbriæ are destroyed; and the openings into the cavity of the abdomen are obliterated.

Tubal catarrh is probably most commonly the result of extension of inflammatory action from the uterine cavity. This may be acute or chronic. The acute form may be due to blennorrhœa. The chronic form may result from the acute, or it may, *ab origine*, have been of a subacute kind. Catarrhal inflammation of the uterus and tubes entails, for one of its effects, a degree of laxity of tissue and dilatation of cavity, as the mucus formed in the tube will naturally tend to discharge itself into the uterine cavity, and commonly this action is favoured by the dilatation of the *ostium uterinum*. If escape by the *ostium abdominale* were common, catarrh would be a very dangerous affection. As it is, accumulations in the tube rarely take this route. It is only when the fluids secreted are large in quantity, formed rapidly, as in blennorrhœa, or some puerperal inflammations, that the risk of retrograde overflow is serious. But when the openings of the tubes are obstructed, the fluids accumulate and distend them, and, by-and-bye, perforation or bursting takes place. This closure is easily produced. At the outer end, catarrhal inflammation often leads to adhesions of the fimbriæ; and, at the inner end, the swelling of the tubes contorting it, forms angular spurs or valve-like bendings, which shut off the communication with the uterus.

Assuming that the lining membrane of the tubes is liable to inflammation which may lead to suppuration, it must be remembered, that in the tubes, as well as in the uterus and vagina, fluids may accumulate which the naked eye could not distinguish from pus, and which, on microscopical analysis, is resolved into epithelium-scales floating in plasma. This was the case in a young woman who died of chorea in St. George's Hospital. The vesicles of the ovaries contained coagula. The Fallopian tubes were full of milky fluid, like pus, which proved to consist of columnar epithelium.* This fact must be borne in mind in estimating the significance of puriform matter in the tubes.

Salpingitis being so frequently a part of an inflammatory process, the chief seat of which is the cavity of the uterus, the treatment merges in that which is indicated for the principal affection. If it lead to the escape of irritating matters or blood into the peritoneum by rupture, perforation or overflow, the case must be treated on the principles laid down when discussing the subjects of Menstrual Retention and Tubal Gestation.

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* See "Catalogue," St. George's Museum, XIV., No. 5.

The *dilatation* or enlargement of the calibre of the tubes is a subject of great importance in its relation to the practice of injecting fluids into the uterus. It so happens that some of the morbid processes which give indications for injecting styptic or astringent fluids into the uterus, also entail undue patency of the uterine mouths of the tubes and of the tubes themselves. The mechanism by which this patency is produced, as well as the morbid processes which bring this mechanism into action, are therefore of special interest. We may take as a type a case of dysmenorrhœa from obstruction at some point of the uterine canal, as at the os internum by flexion. In such a case there is, as I have explained under "Atresia," a degree of retention of menstrual fluid, aggravated by formation of clots. The retained matters irritate the uterus, excite reflex action, and thus cause uterine colics or expulsive pains; that is, the body of the uterus contracts, trying to expel its contents. There is obstruction at the natural outlet; hence, following the general dilatation of the uterine cavity, there is retrograde dilatation of the uterine mouths of the tubes. All this is seen in a marked degree in cases of complete retention; but I believe it is rarely absent in a minor degree in cases of partial retention. The pathological and therapeutical consequences of this state are: secretions of blood, mucus, or pus formed in the uterus may be driven backwards by the contraction of the uterus along the tubes, distending the tubes, exciting inflammation in them, and perhaps leading to discharge into the peritoneal cavity. In a similar manner fluids injected into the uterus excite contraction, and this contraction drives the fluid along the tubes, if its exit be impeded at the neck, either by flexion, or by the canal being filled too closely by the injecting-tube.

This accident may be avoided by the use of remedies in a solid form or as ointments, or of fluids carried on a swab.

The tubes may be distended by accumulations of blood. One cause of this is *menorrhagia*. Usually, the uterine opening gives it passage; but sometimes, if this opening be obstructed, as by a clot, the blood continuing to be poured out by the tubal mucous membrane may overflow by the abdominal end, and give rise to retro-uterine hæmatocele. The like event may occur in the *hæmorrhage of abortion*. Another form of blood-accumulation, and one especially dangerous, is that which results from *atresia, or closure of the uterus, vagina, or vulva*, leading to retention of the menstrual fluid. The Fallopian tubes in these cases commonly undergo extreme dilatation, and are liable to bursting or perforation. This subject is discussed more fully under "Atresia."

In other cases the obstruction takes place at the ostium uterinum. When this occurs, it does not follow that the tubes will give up their part in the function of menstruation; blood will be poured out into the tubes, and, if it do not escape by the ostium abdominale, must accumulate as *tubal retention.* When we look at the contorted shape of the tube, it is not difficult to conceive how easily under distension of one part of the tube, further contortion, producing angular flexion, may occur, so as to shut in the contents. The closure at the extremities of the tubes, especially of the abdominal extremity, is further very likely to be effected by inflammation of the tube and peritoneal investment. This inflammation may be caused by a minute perforation under an ulcerative process, permitting a little of the retained fluid to escape into the peritoneum; or it is, I believe—although there is no distinct clinical proof of this—more likely to happen through transudation, or oozing through the walls of the tube under the combined pressure of accumulation and the excited contractile efforts of the walls of the tube. The contact of the unhealthy moisture thus bedewing the peritoneum would be pretty sure to set up inflammation in this susceptible membrane.

But retention of blood or mucus in dilatations of the tubes may terminate in another way. Peritonitis may or may not supervene; after a time there is no further increment of blood or mucus; the watery part of that already in the tube may be absorbed, and the tube not recovering its pristine form, may assume the condition of cysts.

There is a good illustration of cystiform dilatation of both tubes from tubal menstrual retention in the *Obstetrical Transactions*, vol. viii., described by Dr. Meadows. The subject had had fifteen pregnancies, but only one had gone on to term; menstruation had generally been profuse, and latterly became clotty and painful. She died of extensive peritoneal inflammation, involving the uterus and tubes. The tubes presented cystiform dilatations; no communication was found between these dilatations and the fimbriated extremities, and on the left side the ostium uterinum was quite closed. The dilatations were "all filled with a dark, thick, grumous fluid of a prune-juice colour." This resembles the retained menstrual blood in the uterus, and was no doubt of like origin.

Wagner* describes a case of hæmatoma of the Fallopian tube. There was also an old blood-mass in the pelvis, found after death. The tube was dilated only at the seat of the hæmatoma. There was nothing abnormal in the ovary or uterus.

It seems probable that the closure of the tube at the uterine end or at the fimbriæ is one of the dangers of gonorrhœa, or of those attacks of metritis or peritonitis to which prostitutes are so subject. These attacks, which give rise to the symptoms known as *colica scortorum*, commonly involve the tubes as well as the ovaries. Closure of the tubes almost necessarily is the first condition of retention, and thence of hæmorrhagic and dropsical accumulations.

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* "Monatsschrift für Geburtskunde," 1869.

Dropsy of the tube is probably a secondary phenomenon of various affections, as of inflammation or effusion of blood. Effusions cause distension; these being preceded or followed by closure of the extremities of the tubes, saccular dilatations readily form, and the outlets being closed, sacs of considerable size may form. Baillie describes "dropsy" of the tube, and quotes Portal as having referred to it. Baillie says the tube terminated in a cul-de-sac. Hooper gives an excellent engraving of a case which exhibits very clearly the characteristic contortions and dilatations of the tubes, the maximum of dilatation being on both sides at the abdominal end. Both tubes are generally symmetrically affected. The cyst is not necessarily single, but may be subdivided by tight fibrinous bands, the product of peritonitis, encircling and constricting the tube at various points. The muscular wall is thickened. The mucous membrane is changed from its natural appearance; it becomes smooth or roughened by papillary vegetations from the submucous connective tissue.

In many of these cases the disease is only recognized by dissection, death being, in some instances, brought about by other causes.

The contents of the tube may be mucous, purulent, watery, sanguineous, like serum, or thick. Boinet says he found in a Fallopian tube thirteen pounds of water mixed with pus. Simpson, recalling the intimacy and extent of the adhesions often formed with the ovary, and the ease with which the diseases of the tube may thus be confounded with those of the ovary, doubts the accuracy of Boinet's conclusion.

The quantity of fluid which constitutes the *hydrops tubæ* is not usually very great, but Dr. Peaslee* relates a case in which the patient had been tapped twice for ovarian dropsy, in whom there was found on the right a true ovarian cyst, and on the left a tumour of the Fallopian tube of very large size. The tube had become occluded at the very commencement of the uterus; accumulation took place beyond, until the tube was distended into a sac with the capacity of eighteen pounds. The whole was adherent to everything in its neighbourhood.

Sometimes dropsy of the tubes is associated with, probably dependent upon, general dropsy, as in a case, No. 2254^{30} in Guy's Museum. This specimen shows the uterus and appendages. The right Fallopian tube is greatly dilated. It came from a woman, aged forty-five, admitted for renal dropsy.

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* "New York Medical Journal," 1870.

In a considerable number of cases, obstruction at the uterine orifice of the tube, as by a fibroid tumour, seems to have been the cause of accumulation of fluid in the tubes. This is seen in specimens Nos. 866, University College, and 2643, Royal College of Surgeons. No. 2261^{30}, in Guy's Museum, shows "a fibrous tumour of the uterus. Dr. Oldham dilated the os (uteri) to get at the tumour. Whilst under treatment, the patient was seized with acute peritonitis, and died. An abscess in the left tube, in which the ovary was involved, had burst."

The symptoms produced by dropsy of the tube resemble those arising from other enlargements of the tube or ovary up to a certain point. There is, says Simpson, an uneasy sense of weight in the side affected, and a feeling of pressure in the limb; usually the limb is rendered more or less numb from the pressure of the tumour on the nerves passing through the pelvis, and this may even extend to lameness, as in pelvic cellulitis. In some cases the swelling acts chiefly on the bowels, keeping them loaded. More rarely there is a certain degree of dysuria. Intercurrent at some period of the history, signs of local peritonitis will probably appear.

Diagnosis.—Dilatation of the Fallopian tube may be diagnosed from small cystic enlargement of the ovary by the *shape* of the tumour, its *position*, and by its *relation to the uterus.*

It is of essential importance to clear the way by emptying the bladder, and by determining the exact position of the uterus by the sound.

A small cyst of the ovary gets behind, and a little to one side of the uterus, pushing the uterus forwards against the symphysis, producing probably irritation of the bladder or retention of urine; there is only slight obliquity imparted to the uterus. The shape of the tumour is more or less spherical. It is felt better by the rectum than in the roof of the vagina.

Fluid distension of the tube produces an elongated, contorted, cylindrical swelling. Its position is more forward than that of the ovary; it does not, therefore, push the uterus forward, but pushes the fundus towards the opposite side; there is greater obliquity of the uterus. The swelling also may commonly be felt behind Poupart's ligament, and can be defined between the hand outside and the finger in the vagina. Vaginal touch will enable the observer to detect the swelling on one side of the cervix uteri.

Except in the case of tubal gestation, affections of the tube are commonly symmetrical, that is, both tubes are alike distended. This condition itself would be greatly diagnostic from ovarian disease, which is not nearly so often double, and very rarely, indeed, symmetrical; one ovary, where both are affected, being more advanced in disease than the other. When both tubes are involved, they will keep the uterus straight between them, and a cylindrical contorted roll will be felt on either side.

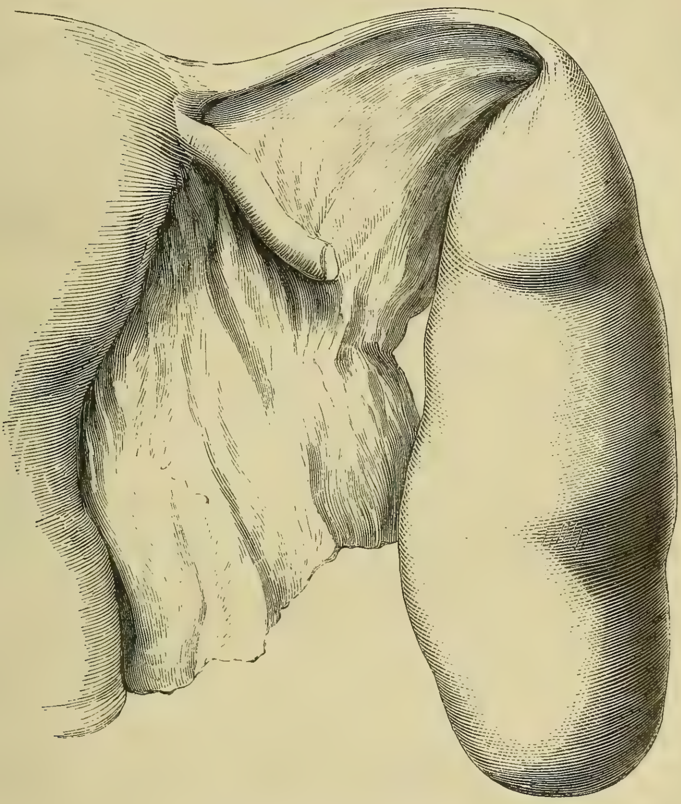

Fig. 86.—(St. Thomas's Museum, nat. size.)
DROPSY OF FALLOPIAN TUBE (R. B.).

Fig. 86 gives an ordinary form of the dropsical tube. It comes from a girl, aged nineteen. Both tubes are tortuous, and each forms an elongated and somewhat conical cyst. The dilatation begins about an inch and a half from the uterus, and gradually increases until it attains a diameter of an inch. The parietes are thinned in proportion to the dilatation. The fimbriated extremities have become adherent to the ovaries and other parts, and thus have become closed. In the living subject these distended tubes would occupy the iliac fossæ, lying nearly in a right line with the fundus uteri.

Another specimen in the same museum, No. F F. 55, shows each tube dilated into a globular cyst. The cyst on the right side was filled with bloody fluid, and some laminated coagula still remain adherent to its upper part. The other cyst is distended with white, fatty matter, contained in numerous cells. The tubes at a short distance from the uterus are completely closed. The uterus is healthy. The specimen was taken from a woman, aged twenty-one, of dissipated habits, who died of phthisis.

An incidental consequence of most morbid conditions of the Fallopian tubes is sterility. There may be mechanical obstruction to the passage of the ovum and spermatozoa; or, if the canal be pervious, the condition of the lining membrane or of the secretions in it may be destructive to the vitality of the male and female elements. Another incidental consequence, is the proneness to extra-uterine gestation.

The *treatment* of dropsical distension of the Fallopian tubes consists simply in puncturing the cysts through the vaginal roof. If a tense fluctuating swelling be found in this region attended by local distress, there ought I think to be no hesitation in tapping it by the aspirator-trocar. This instrument combines in a high degree the merits of the sound and speculum, namely, in being diagnostic and curative. The range of liability to error in diagnosis lies between dropsy of the tube, cysts of the broad ligament, cysts of the ovary, cyst containing an extra-uterine gestation. Now, in all these cases, the same indication exists to puncture of the cyst, so that absolute precision of differential diagnosis is not imperative. The diagnosis may become clearer after the tapping. Thus if the cyst be tubal, or in the broad ligament, it is not likely to fill; there is reasonable prospect of complete cure. But if the cyst be ovarian, it is not unlikely to fill again.

There are many points of special interest in relation to tubal distension. We know the danger of rupture, perforation, or overflow. We know that this danger is averted or greatly lessened, if the contents of the tube can be evacuated by the natural route into the uterus. Can nothing be done to turn the discharges into this, their natural drain? To accomplish this object, Dr. Tyler Smith proposed "*Fallopian catheterization.*" He demonstrated the practicability of passing a fine whalebone probe into the tube. The proposition when originally made, and since, encountered considerable criticism; it was said to be rash, dangerous, and impossible of execution. The real objection is that it is new and difficult. I think the operation will be established in spite of the ridicule and the arguments aimed against it, and that the difficulties of diagnosing the cases proper for its application, as well as of carrying it into execution, will be greatly lessened. Many of the reasons which are recognized as justifying catheterization of the uterus, apply to catheterization of the tubes. The obstacle to the onward discharge of mucus or pus from the tube commonly exists in the uterine portion, which is naturally contracted, and may be occluded by a plug of clotted blood or condensed mucus or pus. A very slight force would remove this impediment, and the passage of a flexible probe through this part would not be difficult. Whether it would be easy or feasible to pass a probe to any considerable distance along the canal, following its sinuosities, is a matter for experience to determine. It will, I think, rarely be necessary. I can, indeed, imagine that a tubal gestation-sac might be ruptured in this way, and the gestation so brought to an end. But the tapping of the sac may be better accomplished through the roof of the vagina.

It deserves to be borne in mind that the secret of preventing many of the tubal diseases, of curing some and of averting the chief danger of others, consists in securing patency of the uterine ends.

Fibroid tumours, or myomas, similar in character to the tumours so named of the uterus, may occur in the Fallopian tubes. Baillie describes "a hard tumour growing from a Fallopian tube, which exhibited precisely the same appearances as the hard tubercle (fibroid) of the uterus." They are developed out of the muscular coat. They attain a considerable size. Professor Simpson describes one as large as a child's head; but probably this was of exceptional size. They are rare, or, at least, have been rarely identified as distinct from uterine fibroids or solid ovarian tumours. Arising on one side of the uterus, that is, in a situation very close to that of ovarian tumours, and being at first moveable, the difficulty of discrimination must be almost insurmountable during life. And even after death there is room for doubt, for a fibroid tumour, taking its origin in the external strata of the uterine wall, may be gradually cast off so completely that the pedicle even becomes atrophied and no longer traceable; the detached tumour then may lie between the folds of the broad ligament in such close proximity with the tube, that appearances may support the idea that this was its true origin. They would differ from ovarian tumours in their progression. Comparatively inert, they annoy chiefly by mechanical pressure; they may get jammed in the pelvis, and displace the uterus, and press upon bladder or rectum. If of large size, and situated above the pelvic brim, their bulk and weight would cause inconvenience, perhaps peritonitis. In the event of symptoms severe enough to indicate the expediency of removing the tumours, the operation as for ovariotomy might be performed, with a fair prospect of success. It is also possible that small ones dipping low in the pelvis by the side of the uterus might be removed by the vagina.

Tubercle most frequently occurs in association with tuberculous deposit in the uterine cavity; but it may occur in the tubes alone. Such a case is preserved in St. Thomas's Hospital Museum. The tube is there filled with a cheesy, soft mass; the tube is swollen, distended, resembling in outward form the distension from fluids. Generally both tubes are symmetrically affected.

Rokitansky says tubal tuberculosis generally occurs as a primitive affection, and is afterwards complicated with tubercle of the abdominal glands. It is also associated with tubercle of the lungs and mucous membrane of the intestinal canal.

It appears sometimes in childhood, sometimes in the age of decrepitude, but usually in the period of puberty. Often it becomes developed in consequence of childbed. Rarely, the tuberculous mass goes into calcification.

In St. George's Museum are two specimens of "scrofulous disease" affecting the mucous lining of the uterus and tubes. In one, both ovaries were also affected, "containing the remnants of a semi-fluid tubercular matter;" in the other, one ovary was converted into an abscess containing scrofulous pus. Both subjects had tuberculosis of other organs as well.

Two specimens in Guy's Museum (Nos. 2251 and 2251^{10}) show tuberculous matter in the tubes of children. One of these died of strumous inflammation of the brain. There were also tubercles in the lung. But it may happen that, although tubercle in the Fallopian tubes is generally of secondary importance as a cause of death, the function of the tube being of little comparative moment, the disease in this part may be the immediate cause of death. Perforation of the tube may outstrip the fatal march of tubercle in the lung. Specimen No. 2251^{40} in Guy's Museum exhibits "the tubes and ovaries inverted in adventitious tissue, forming part of a general tubercular peritonitis. The tubes were greatly distended with thick white grumous matter. The subject, aged twenty-two, died of phthisis and peritonitis."

Carcinoma occurs as an extension of the same disease from the uterus or ovaries. Kiwisch saw a case in which the tube burst from distension of the walls with cancerous tissue.

THE BROAD LIGAMENTS.

Apart from the puerperal inflammations which are beyond the scope of this work, and the inflammations which arise in connexion with uterine and ovarian disease which are more particularly described as a part of the history of these diseases, and under the heads—Pelvic Peritonitis, Cellulitis, Perimetritis, Hæmatocele, the principal affections to arrest attention in this place are *dropsy, cysts, fibrous tumours,* and *phlebolithes.* Cancer, phlegmasia dolens, and diseases of lymphatics fall better within the history of uterine and ovarian diseases.

Extra-ovarian cysts, or cysts of the broad ligament and of the Fallopian tube, are chiefly of two kinds. One kind is a dilatation of the *terminal bulb* or vesicle of the tube (see Figs. 3, 9). In the form and size figured, they cannot be called pathological. They rarely exceed in size that of a pea or nut, but occasionally are found as large as an egg. They usually have thin walls, are covered by peritoneum, and hang by a long slender pedicle. They may burst; but the small quantity and innocent nature of their contents cause no great irritation in the peritoneal cavity.

The other variety of cyst is found between the folds of the broad ligament, at least in its original stages. It is a development of one of the *tubules of the parovarium* (see Fig. 3). These cysts may attain sizes varying from that of a pea to that of a man's head; but the latter size is probably rare. The walls may become thickened by development of fibrous tissue; but still they remain comparatively thin. They differ from the greater number of ovarian tumours in their sphericity, and in fluctuation being equal in all directions. As these cysts are strictly simple and innocent, and not likely to fill again if emptied, there is no sufficient reason, supposing diagnosis be clear or even presumptive, for subjecting the sufferer to the grave risk of an operation for extirpation, or even to that of injecting tincture of iodine. Simple tapping is often enough for their cure. There can hardly be a doubt that some cases of presumed cure of ovarian cysts by injections of iodine or by vaginal tapping were really cysts of the broad ligament. At least I have no doubt that such was the true nature of some cases which have occurred in my own practice. The possibility of a cystic dropsy being of this kind dictates the expediency of executing a preliminary tapping in cases where the fluctuation is very free and universal. The fluid drawn off may determine the diagnosis. Dr. Bantock examined the contents of a cyst of this kind. The specific gravity was 1003·6. It was a watery, slightly albuminous fluid (*Obstet. Trans.*, 1874).

When smaller than an orange they may be retained in Douglas's pouch. Puncture by an aspirator-needle through the vaginal roof, may be enough to cure them.

The features of a cyst of this kind, when greatly enlarged, are illustrated in a case operated upon by Mr. Wells. "A lady, aged twenty, had observed an increase of size for a year. The abdomen was occupied with a fluctuating tumour which extended upwards two or three inches above the umbilicus. The uterus was far backwards, a little to the left, and freely moveable; the right side of the vagina was depressed, giving rise to the impression that the connexion was with the right side of the uterus and rather close. The disease gave so little uneasiness that all interference was postponed for some months. In the meantime the increase had been rapid. The cyst was then removed, and the adjacent ovary along with it, as it felt hard and appeared larger and more corrugated than is usual in unmarried women; though from its being quite apart from the tumour, it would have been easy to remove the cyst and leave the ovary. The pedicle was not thicker than a finger. Another cyst, the size of a walnut, in the left broad ligament near the ovary, was laid open and emptied. Dr. Wilson Fox reported the removed cyst as when distended about twice the size of an adult head. The Fallopian tube flattened out is seen to course along its external surface. The fimbriæ are, however, non-adherent and distinct. The ovary is found in a fold of the broad ligament distinct from the tumour, and presenting the natural appearance. It contains no cysts. The cyst itself has a smooth external wall. It is lined internally by a flattened polygonal epithelium. No villous or papillary growths can be discovered on its inner surface. This was of a delicate rose colour. The vascularity of the cyst was not very great. No other cysts could be found in the broad ligament."

The vessels in the broad ligaments are a favourite seat of *phlebolithes,* or stony transformation of blood-clots. The vessels, slenderly supported by the flaccid tissues through which they run, liable to great variations of fulness and tension, and embraced between layers of peritoneum extremely liable to inflammation, are subject to dilatations and formation of thrombi. These vary in size from that of a pea to nearly that of a cherry. Undergoing hardening they may become calcareous. As in the case figured in Carswell, the ensuing obliteration of the vessels may lead to atrophy of the uterus.

Hæmatoceles, or blood-effusions, may form in the broad ligaments. These will be more conveniently discussed under the general head of Hæmatocele.

CHAPTER XV.

NATURAL COURSE AND TERMINATIONS OF OVARIAN TUMOURS.

THE terminations of ovarian cystic tumours are various; but the progress is generally towards a fatal issue. This chapter on the history of ovarian tumours, by showing the dangers ahead, will give more accurate indications for treatment.

1. Ovarian cystic tumours tend to go on growing until the distension is too great to be borne. The cyst pressing in all directions, and not able to extend backwards or much into the pelvis, stretches the abdominal walls in front, and the diaphragm above, driving the intestines backwards and even encroaching upon the cavity of the chest. The circulation is impeded by the pressure upon the aorta and vena cava. The functions of the viscera, abdominal and thoracic, are impeded by pressure. The viscera undergo a degree of shrinking or atrophy. Nutrition, respiration, and circulation being imperfect, in the end *exhaustion* ensues.

In cases of long standing, some amount of compensation is effected by *dilatation of the superficial veins* of the abdomen. Sometimes, but by no means commonly, relief is sought by *serous effusion* in the legs. More or less œdematous thickening of the integuments of the lower abdomen where the overhanging of the tumour is greatest, is not infrequent. Probably the *effusion into the cyst* itself acts as an accommodating process.

2. Sometimes death occurs rapidly or suddenly from *asphyxia*, owing to the pressure upon the heart and lungs. Mr. R. F. Battye relates a case of this kind in a girl aged 13. (*Obstet. Trans.*, vol. ii.)

3. As Bright says, some state of unexpected *collapse*, for which no reason can be assigned, takes place, and the patient sinks. I have seen several such instances. One occurred at St. Thomas's. A young woman was admitted with a large ovarian cyst which had formed rapidly. Tapping was contemplated, but before it was performed, death took place almost suddenly under symptoms of lung distress. It was conjectured

that rupture of the cyst might have taken place; but the cyst was found so universally adherent that there was no spot whence effusion could take place. The diaphragm was driven up so as to confine the heart and lungs within the narrowest space. The lower lobes of the lungs were so compressed that they presented a foliaceous appearance, resembling the atelectasis of new-born infants. I concluded that under the impetus of some excitement or exertion, the heart and lungs were suddenly taxed beyond their feeble powers of adaptation, and that thus asphyxia was induced. In these cases of very large tumours there is not only encroachment upon the space naturally pertaining to the thoracic organs, but the chest walls are nearly fixed. The proper respiratory movements are restricted, so that on any sudden impetus to the circulation or respiration, the balance is destroyed and asphyxia results.

4. The cyst being free from adhesion, and tolerably firm, may *roll over on its axis*. This may happen from the enlargement of the uterus tilting it over, or from over-exertion, when one part of the tumour being more pressed upon than the opposite part, it rolls over. The effect of this axial twisting is to strangulate the pedicle; the blood-vessels cannot return the blood from the tumour, so congestion and bursting of the vessels follow. Hæmorrhage into the cyst, leading to sudden distension, produces shock and anæmia sufficient to cause death, without rupture of the cyst and hæmorrhage into the peritoneum, which may, however, also happen.

Should the patient escape the more immediate danger of death from shock, hæmorrhage, and peritonitis, the strangulation of the tumour is almost sure to lead to *gangrene*.

But when the strangulation takes place very gradually, or when the tumour is not very vascular, atrophy taking place slowly, and the pedicle being constantly stretched, *complete separation has taken place*, the tumour becoming loose; or the tumour may shrink without being detached. The remains of tumours have thus been found in Douglas's pouch as hard, partly cartilaginous substances.

I have related two cases of this axial twisting in St. Thomas's Hospital Reports, 1870. In one case the rotation was caused by the growth of a gravid uterus; gangrene had set in; in the other there was no pregnancy, and the rotation was in all probability caused by severe bodily exertion. Dr. St. John Edwards of Malta relates a case (*Lancet*, 1861). The subject had gone through one labour without mishap, notwithstanding the complication with a moveable ovarian tumour; in a second pregnancy labour supervened at the seventh month, collapse and death ensued; the tumour was found twisted and strangulated. Knowsley Thornton relates * a case similar to one of mine. The cyst rolled over three times on its axis under the rising of the gravid uterus. Gangrene set in. Ovariotomy was performed, but death ensued. Atlee refers to two cases of Dr. Van Buren of New York, and to one of Dr. Crane. In the latter the twisting occurred during labour, leading to fatal peritonitis five days after labour. Dr. Malins relates (*Lancet,* 1877) a case in which rotation followed on tapping. Dr. Kidd (*Dub. Quart. Journal,* 1870) relates one in a non-pregnant girl. Rokitansky (*Allg. Wiener. Med. Wochenschr.,* 1870) describes many dissections which show: *a.* Atrophy and twisting of a Fallopian tube, through the dragging of its ovary, as by an ovarian fatty cyst or serous cyst, which in its growth may pull, stretch, and rend the attached tube. *b.* Tearing asunder of a tube through the dragging of pseudo-membranous adhesions, as through adhesion of the right tube to the small intestines. *c.* Tearing asunder of a tube or corresponding ovary, as when the tube and ovary adhere in the recto-vaginal space; the tearing being caused by the uterus enlarging in repeated pregnancies. *d.* Axial twisting. Professor Turner also has contributed a valuable memoir "On Separation and Transplantation of the Ovary due to Atrophy of the Broad Ligament and Fallopian Tube." (*Edin. Med. and Surg. Journ.,* 1861.) Klob also illustrates these events.

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* "Pathological Transactions," 1876.

5. It is probable that some cystoids of the ovary undergo a kind of *atrophic involution,* which may be regarded as a spontaneous cure. In old women the ovaries are sometimes found as agglomerates of smaller or larger degenerated cysts, seated in an extremely hard thick stroma. On their inner surface are seen papillary outgrowths, likewise converted into hard knots. Such formation, says Rokitansky, must be regarded as involved shrunken cystoids.

6. Small tumours getting into Douglas's space may push the uterus forward upon the bladder so as even to cause *retention of urine.* In the case of large tumours, the neck of the bladder is sometimes pulled up along with the uterus, so that the control of the sphincter is impaired. Hence enuresis. This trouble is also created at times by the pressure of a large tumour downwards upon the bladder. Bladder distress is even more likely to arise when the tumour is the centre of a mass of adhesions impeding the mobility of the pelvic organs. Cystitis and urinæmia may even be induced, and thus cause death. Or the tumour may so press upon the kidneys and ureters, as in a case told by Wells, that the kidneys may be almost obliterated, and thus produce *urinæmia.*

7. In like manner ovarian tumours may encroach upon the rectum, causing at times *obstruction to the passage of fæces.* A fatal case of obstruction of the rectum by an enlarged ovary is related by Dr. Parker (*Ed. Med. Journ.,* 1863).

8. Another mode in which ovarian tumour may cause rapid death is by *ileus.* Vomiting, perhaps of stercoraceous matter, and the other symptoms of intestinal obstruction, come on and carry off the patient. On examination after death no adhesions or other obvious cause of constriction of the intestinal canal are found. It can only be conjectured that, owing to the extremely small space into which the intestines have been squeezed, they get thrown into angular contortions which, when any unusual pressure from without, or distension of a part by flatus or otherwise supervenes, the peristaltic action is disordered, and there occurs a virtual obstruction. In one case Rokitansky found a fatal constriction of the intestines caused by the rotations of the tumour, a dermoid one.

9. In other cases *adhesions to the intestines* have been found, which were sufficient to account for the obstruction.

10. The disappearance of the disease by *spontaneous resorption of the fluid and shrivelling of the cyst,* is not proved. The lining membrane of the cyst has the property of throwing fluid into the cyst with extreme facility, but not in the converse direction. So long as the fluid is confined in the ovarian cyst it is beyond the influence of absorption. So much at least is true as far as sure clinical experience proves. Cases do, however, occur in which considerable accumulations, believed to be in ovarian cysts, disappear more or less completely, either spontaneously or under the use of diuretic and other medicines. There was a woman in St. Thomas's Hospital under the care of Dr. Gervis and myself whose *history* gave support to this hypothesis. She then carried a very large ovarian cyst seemingly single; two years before, she said, she had one nearly as large, and the swelling disappeared under medicines, water passing freely by the bowels and bladder. I cannot help suspecting that in this and similar cases, the fluid escaped first into the peritoneal cavity by rupture or a small perforation, or else by a fistulous channel directly into the bowel.

11. *Bursting of the tumour and absorption of fluid from peritoneum.*—When the tumour bursts with escape of contents into the peritoneum, the fluid, if limpid, may be taken up into the circulation and discharged rapidly by the excreting organs. Numerous cases are on record of the spontaneous or accidental bursting of ovarian cysts, followed by cure in this way. If the walls are thin, and the tumour tense, under gradual or sudden pressure or violence rupture may take place. The tumour in such cases is probably simple.

In this way cysts have burst under the rapidly accelerated pressure caused by the simultaneous growth of the pregnant uterus, under sudden exertion, under direct violence as of a blow, or under concussion as from a fall. A remarkable case occurred in the temporary St. Thomas's Hospital. A woman under my care was descending in the lift to take the air in the grounds, when the machinery gave way and the lift came down the last few feet with a run. The concussion burst the tumour; large quantities of watery fluid were discharged during the next few days by the bladder, and she completely recovered, the tumour not returning.

The recovery, however, is not always complete. After bursting and absorption of the fluid, the tumour may form again, just as we see after the operation of tapping. Thus W. F. Soltau relates a case (*Medical Times and Gazette,* 1862) in which the cyst burst three times into the peritoneum; the fluid was voided by diuresis. She was also tapped thirty-seven times. She died after the bursting. Disse relates a case (*Monatsschr. für Geburtsk.,* 1860) in which the patient recovered from one bursting, the fluid being discharged by the kidneys. After a few years the tumour burst again. The second rupture of the cyst was verified by autopsy. Obstinate constipation followed the accident, then copious watery discharge by rectum; in two days eighteen quarts were measured. When this ceased, profuse discharge of urine occurred; during five days eight quarts were passed daily. She sank exhausted.

Huguier expressed a doubt whether cases of this kind were really bursting of an ovarian tumour, and suggested that they were more likely examples of simple cysts of inflammatory origin attached to the uterus.

I think we must accept this explanation for some of the cases of presumed cure of ovarian cysts following rupture or simple puncture. But certainly the possibility of some ovarian cysts being so cured seems free from doubt. In the case at St. Thomas's, above referred to as having been caused by the shock of a fall, the ovarian nature of the cyst had been verified by repeated examinations. And the possibility of an ovarian cyst healing after rupture is proved by two specimens in Guy's Hospital Museum, of ovarian cysts, which had burst spontaneously, the rent cicatrizing. The first specimen, No. 2246^{64} is "a large ovarian cyst, which had burst spontaneously, and had become repaired." Within it an inverted portion of the old wall is seen, and a reduplication of the cyst is indistinctly seen in the section. The case was that of Ann B., aged 46, under Dr. Addison, in 1836. When first seen, in March, 1834, she stated that she had had children at an early age, and had menstruated regularly since; that five years before she observed a swelling in the right iliac fossa, that the tumour increased, although her health remained good until ten days ago, when she fell, and struck her abdomen. She was seized with violent pain, sickness, and fainting, and then perceived that the swelling, which was before local, had diffused itself over the abdomen. On admission she was suffering from acute peritonitis. She soon perfectly recovered, and again entered into domestic service in 1836, only a small tumour in the left iliac region being distinguishable. She died in August, 1836, and the sac was removed. There were adhesions in various parts of the abdomen; the ovarian cyst occupied the pelvis, and was closely connected to surrounding parts. It contained about two quarts of a reddish thick fluid, and the lining membrane was covered with thick layers of albuminous matter. Upon the front of the tumour was a band, formed by the folding of the walls upon themselves as the cavity shrank. The walls were so firmly united that the reduplication was only clearly seen when a section was made. The rupture had been about eight inches in length. The edges of the rent had not united, but the inferior lip was found floating free within the cavity, whilst the superior lip of the rent was glued over the opening to the cyst below.

The other specimen, No. 2239^{84}, is equally decisive. It is "a uterus and a portion of a large cyst from the left ovary. It is of a compound serous kind, and had burst spontaneously during the life of the patient, from which accident she recovered, and survived several months. The cicatrix appears in the portion of cyst preserved. The patient died from malignant disease of the stomach." A third specimen in the same museum, No. 2231^{56}, affords evidence to the same point.

In St. Bartholomew's Museum is an illustrative specimen (No. 31.31). It "is a portion of a cyst that arose from the left ovary. It communicates with the ilium by a small aperture, between four and five inches above the ileo-cœcal valve. Some weeks before death, after the discharge of a large quantity of fluid *per anum*, the abdominal tumour had diminished in size, and the dulness to percussion over its region had been replaced by tympanitic resonance."

These cases place the possibility of cure of ovarian cystic disease, by rupture or perforation, beyond dispute.

In another class of cases, perhaps more frequent, the patient dies quickly, killed by the shock; or if she rallies from shock, peritonitis sets in, which is most likely to prove fatal. This danger appears to depend in great measure upon the qualities of the fluid effused. If clear and watery the fluid itself may cause little irritation; the peritoneum tolerates it well. If it act injuriously, it is probably chiefly because it is voided suddenly in large quantity, so as to disturb the balance of circulation greatly. It is the shock that is dangerous; the fluid itself is harmless. But where the fluid is gelatinous or puriform it is clearly not favourable for absorption, and it may even possess acrid or irritating properties. Hence there is added to the simple shock, retention in the peritoneum of an irritating fluid. Peritonitis is inevitable; and since the cysts which yield fluid of this nature are commonly multilocular and incurable by simple tapping, the progress of the tumour is not stopped. If the patient survive the shock and peritonitis, the ovarian disease will pursue its natural course notwithstanding. Mr. Spencer Wells relates a case (*Medical Times and Gazette,* 1861) in which, after ovariotomy, the serum found in the peritoneum must have contained a very active animal poison. He himself suffered from absorption. Sometimes when a cyst bursts, vessels in its walls are torn, and blood to a considerable extent may be effused into the peritoneum along with the ovarian fluid. This complication increases the danger of peritonitis, and adds that of anæmia.

12. *Bleeding from the surface of the cyst or into its interior* may take place without rupture or twisting. In such an event death may be rapid under symptoms resembling those of rupture of an extra-uterine gestation cyst. The patient may bleed to death. In one case Mr. Wells says the blood escaped through the Fallopian tube and uterus from a large cyst in the ovary; or the blood may collect in the recto-uterine pouch, where it may be sequestrated as a hæmatocele; or it may remain diffused, and cause fatal peritonitis.

13. The cyst may *contract adhesions with the bladder or bowel,* and by bursting or *ulcerative perforation into one of these viscera,* its contents may be discharged. Communication thus established with the exterior is more favourable than rupture into the peritoneum. The bladder and the bowel—the latter especially—are less liable to injury, and can, moreover, readily get rid of the offending matter. In this way even fluid of tenacious or gelatinous nature may be discharged. Thus Ulrich (*Monatsch. f. Geburtsk.,* 1859) relates a case in which a large quantity of thick fatty matter was emptied by the bladder; it was ascertained to be pure elaine; several quarts were passed. For a long time the urine contained pus and fatty matter. The patient recovered, some remains of tumour being still felt. The tumour was probably dermoid.

The London museums contain several interesting examples of ovarian tumours opening into the hollow viscera. At Guy's is a specimen (No. 2228^{35}) from a woman, aged 36, under Dr. Gull, in 1861, for Bright's disease. At the same time there existed in the abdomen a remarkable tumour, being a cyst containing fluid and air. On striking it, a loud splash was heard, and at the same time it was resonant on percussion. After death, on opening the tumour, a fœtid gas escaped, and at its lower part was a turbid purulent fluid. The intestines were adherent to it, and at the bottom was an opening communicating with the upper part of the rectum.

Dr. Murchison (*Path. Trans.* vol. xviii.) relates the following:—E. C., aged 37, for eight years had been liable to general dropsy and attacks of erysipelas of the face. About eighteen months before admission to Middlesex Hospital she first noticed a swelling in the lower part of the abdomen. On admission the abdomen was distended by a tumour rising above the pubes. The urine contained albumen. The patient began to suffer from diarrhœa; the stools contained blood. This continued for sixteen days, during which time there was no diminution in the size of the abdomen. Then the stools contained a quantity of pus, which went on for three days, and in a week all signs of the tumour had disappeared. The patient sank two or three days later. The liver, spleen, and kidneys were very large. A collapsed cyst, the size of a cocoanut, was seen in the situation of the uterus. This was a cyst of the left ovary, which had emptied itself by an opening the size of a fourpenny piece into the rectum four inches above the anus.

In St. Thomas's Museum is a specimen (FF 45) of a fæcal abscess communicating with an ovarian cyst.

Perforation must be distinguished from bursting. Perforation is a gradual process, and is more likely to occur in the glandular cystomas than in the simple cysts. An opening may be effected direct into the peritoneum, or into a hollow organ. The causes of perforation are: 1, a *wearing-through of the cyst wall by partial pressure* of the growths from within a papillary cystoma. They may then grow on unhindered in the peritoneal space, and, sooner or later, cause fatal peritonitis (see Fig. 79). 2nd, *suppuration*, a frequent cause of perforation. In this case the opening is seldom inside the peritoneum; it mostly opens externally or into a neighbouring hollow organ. Dr. O. Spiegelberg relates some good illustrative cases (*Arch. f. Gynäkologie*, 1870).

Dr. Bristowe described these perforations (*Path. Trans.*, 1853, vol. v.), having several times seen perforations of ovarian tumours into the peritoneum, precisely resembling those between the cysts themselves, and (vol. xii.) says it is extremely common. Adjoining cysts are constantly opening into one another; and cysts are almost as constantly rupturing into the abdominal cavity. In both cases the steps of the process are identical: first, the outer surface of the wall yields at isolated points, in consequence of the distension due to the accumulating fluid within, and circular or oval depressions of various sizes are produced; secondly, these enlarge in area, and deepen, and finally perforate; thirdly, the contents of the cyst escape, the cysts collapse more or less, atrophy, and ultimately, in consequence of the growth of new cysts in their walls, of the enlargement of neighbouring cysts, and of their own shrinking, form irregular crescentic or sinuous folds.

Most commonly these perforations are attended by adhesions which, uniting the cyst with a hollow organ, form a substance through which a fistulous tract is gradually made. In this way the abdominal cavity is protected. I believe that it is through small perforations occurring that the frequent attacks of peritonitis are produced; and that we may thus look upon the adhesions so commonly found, as the effect and evidence of a conservative process enacted to limit the mischief. No sooner does a minute perforation take place than the opening is glued up by plastic effusion.

But sometimes adhesions do not form in time. Then the perforation allows the contents of the cyst to escape into the peritoneal cavity, and the result may be quickly fatal.

In St. Thomas's Museum (No. FF 32) is an example of spontaneous perforations in an ovarian cyst. The perforations allowed free communications with the abdominal cavity; their edges were well-defined, and bevelled off at the expense of the outer edge. No. FF 33 is an example of the same kind.

Occasionally adhesions form to the diaphragm, and the ulcerative process, continuing in an upward direction, the pleuræ and lung may be attacked.

In the College of Surgeons is a specimen (No. 2623) consisting of a portion of diaphragm, with part of a large ovarian cyst firmly adherent to its peritoneal surface. On the inner surface of the cyst there are numerous smaller cysts and tumours connected with it, and with one another by pedicles and bands of false membrane. A portion of lung adheres to the corresponding pleural surface of the diaphragm. The cyst had been tapped several times, but could not be completely emptied, for it was sacculated. It adhered firmly to most of the abdominal viscera. (*From MSS. of Geo. Langstaff.*)

Sometimes the ulcerative process works from the intestines towards the cyst. Bristowe (*Path. Trans.* vol. xiv.) presented an example. There was extensive ulceration of the mucous membrane of the large intestine. The patient suffered from phthisis. The ovarian cyst had not opened into the bowel, but the intestine ulcerated and opened into the cyst. Fæcal abscesses had first formed, one of which had perforated the ovarian cyst.

Ovarian cysts may also discharge through the Fallopian tubes. Richard cites cases of cysts which had involved a considerable portion of a tube, through which their contents could be forced into the uterus. The portion of tube implicated had become increased in length and thickness, and the folds of its mucous membrane were partly effaced. A distinct aperture between cyst and tube was found. In these cases the aperture was no doubt effected by a gradual perforative process.

Apart from bursting, if not from perforation, intercurrent attacks of peritonitis are common in the progress of ovarian tumours. Such an attack may prove fatal, but more commonly recovery takes place, leaving adhesions of tumours to the walls of the abdomen and viscera.

14. *Inflammation in the interior of the cysts* also not seldom occurs. It is of a low kind, and suppuration is often the result. This process may be limited to one or more of the cysts, others retaining their pristine condition. There is reasonable presumption that suppuration has taken place inside a cyst, if symptoms of hectic or irritative fever set in after acute pain in the seat of the tumour. This may occur without detected cause, or follow on tapping or other form of injury. The disease may run on rapidly with intense symptoms and general peritonitis to a fatal termination; or it may be localized, and lead to suppuration in the cavities of the tumour. This may go on for some time, with the production of pus; or the contents of the cyst may be converted into any of the foul, disgusting fluids, the result of decomposition. The fatal termination, if the cysts be not removed, may be due to diffuse peritonitis, but more commonly to septic or pyæmic fever, the result of absorption, or of admixture more or less direct through the vessels of the cyst, of the putrid fluids or gases with the blood. Dr. Chadwick, of Boston, relates an instructive illustration (1877).

15. *The roof of the vagina may burst,* and allow the ovarian tumour to protrude through it. Berry relates a case referred to in succeeding page. Luschka (*Monatsschr. für Geburtsk.,* 1867) relates a case of rupture of the vagina, and protrusion of an ovarian tumour. Jobert de Lamballe communicated a case in which under labour an ovarian cyst burst out through the vagina (*Académie de Médecine,* 1850). W. L. Dunn relates a case in which an ovarian tumour coming down before the head in labour accelerated by ergot, tore its way through the vagina. Recovery took place.

16. The tumour may escape by *bursting or perforation of Douglas's sac through the rectum,* and present at the anus. A. W. Stocks (*Brit. Med. Journ.,* 1875) relates a case. The tumour was removed, and the woman recovered.

The *rate of growth or natural duration* of ovarian cysts varies with the kind of tumour, and other circumstances, one of which is the age of the patient. The simple non-malignant cysts generally go on steadily increasing, attaining a size that entails distress of breathing and danger to life, in about two or three years from their first attracting attention. But it is almost certain that the earlier stages of growth may extend over a considerable time before, either by bulk or pressure on the abdominal viscera, the tumour is noticed by the patient. We have, then, an unknown quantity to add to the known; and this circumstance frustrates all attempt to arrive at a precise estimate of the rate of growth or duration. Not seldom there are alternations of increase and of standing-still. After remaining passive for a considerable time, a stage of rapid accumulation may set in. Scanzoni believes menstruation stimulates the growth. The partly solid non-malignant tumours may last many years, growing very slowly, thus admitting of gradual adaptation of the compressed organs, and of the system generally, to the inconvenience, before distress becomes intolerable, or a fatal result ensues. I have known distinct evidence of ovarian tumours to extend over twenty and even thirty years. The dermoid cysts especially are of unlimited duration.

The malignant and proliferous forms proceed more rapidly. The history of many of these cases is brief. It is measured by months rather than by years.

In cases of long standing, œdema of the legs is a frequent consequence. It is caused either by pressure on the renal vessels, inducing hyperæmia of the kidneys, by independent or induced Bright's disease, by pressure on the pelvic veins, or by thrombosis in the pelvic and femoral veins. In the latter case the prognosis is bad, as it generally indicates malignant disease spreading into the broad ligaments, and matting the pelvic structures together. If ascites be added, the probability of malignant disease extending to the abdominal glands and other structures is much increased.

The effects of ovarian cystic disease upon the proper ovarian functions are various. We have seen that in many cases ovulation may go on. Even in a diseased ovary a portion may remain unaffected, and suffice to stimulate menstruation. And, although in many cases it is found that both ovaries are invaded, yet it is rare that the proper structure of both is entirely destroyed. In some cases, perhaps exceptional, and only for a time, there is menorrhagia. More frequently menstruation becomes scanty, and at last ceases. This undoubtedly is often the consequence of general dyscrasia. That menstruation may go on is *primâ facie* evidence of the possibility of conception. Morgagni said (*Epistola* xlvi., *art.* 28) that a woman may conceive if there remain as much of one ovary sound as pertains to one mature vesicle. It is a fact that in many cases pregnancy does take place. It may even go on to the natural term, and delivery take place without accident. I have known examples of several successive pregnancies thus being accomplished. But the risk is serious. In another class of cases the uterus is unable to pursue its full development, and abortion or premature labour sets in. *During pregnancy* the tumour may be twisted on its axis; it may burst; it may become inflamed and suppurate. *During labour*, again, it may burst. I have seen a fatal result in this way. Or if bursting be avoided, the crushing of the tumour may give rise to hæmorrhage, suppuration, or gangrene. There is an extraordinary specimen in St. Bartholomew's Museum (No. 31.34) contributed by Mr. Berry, of Birmingham. It is an ovarian cyst which had protruded through the external parts by rupture of the vagina during labour, and which was afterwards removed by ligatures with success—a singular instance of ablation of an ovarian tumour by this route.

On the other hand, the uterus may rupture from the obstruction to labour caused by an ovarian cyst. (Ogier Ward, *Path. Trans.*, vol. v.)

The breasts are often affected. In some cases they become tumid, even yield a little milky fluid, and the areola is darkened. This chiefly happens during the earlier stages of the active tumours. Generally when the disease is of long standing, the breasts become flaccid, and shrivel. This may be an indication that the follicular structure of the ovary has been destroyed.

DIAGNOSIS OF OVARIAN TUMOURS.

The *Diagnosis of Ovarian Tumours* involves the analysis of all pelvic and abdominal tumours. The recognition of an ovarian tumour really involves very often the decision between life and death. Whether an operation of a most severe, possibly fatal, nature shall be performed or not, depends upon the diagnosis. And if we do not operate for want of an accurate diagnosis, the patient may equally incur the penalty of death. The pregnant uterus has been tapped or opened in mistake for an ovarian tumour. An ovarian tumour has been often mistaken for pregnancy; and this latter error may subject the patient to an imputation of dishonour, than which death itself will, to some minds, appear more tolerable.

The first point to determine is the presence or absence of *pregnancy*. Peaslee observes that the diagnosis of pregnancy in the early months does not come into practical consideration, since it is only when ovarian tumours have attained the size of the gravid womb at five months or more, that the question of extirpation arises. But there are other reasons for forming a diagnosis at even the earliest stage. A proper weight must be given to the evidence of history. This may or may not be useful; but it is not safe to rely upon anything but physical exploration. We must, then, make a systematic search for the objective signs of pregnancy. We must examine the breasts; observe the degree of tension, the veins running to the areolæ, the pigmentation and area of the areolæ, the development of the follicles, the presence or absence of milky secretion. Then, examining the abdomen by careful palpation, we search for uterine and fœtal movements; by stethoscope in the groins and over the abdominal tumour we listen for uterine and fœtal sounds; by vaginal touch we determine the softness or hardness of the cervix uteri, the patency of the os, its relative position in the pelvis; the presence or absence of what I have described as vaginal roof-stretching, that is, the tense inclined plane formed by the enlarged body of the uterus pressing upon the roof and anterior wall of the vagina—(see Fig. 57, p. 175)—and through which, if the uterus be pregnant, we may feel its rounded solid bulk. The speculum may furnish almost conclusive evidence. If the dark-blue turgescence of the vaginal-portion and vagina, with softness of the vaginal-portion, the enlargement with anteversion of the uterus co-exist, pregnancy may with confidence be affirmed. If to this combination be added venous and capillary distension of the superficial vessels of the legs, and increased vascular tension, we have a concord of symptoms which I believe is only to be found in pregnancy. And this concord is found in early pregnancy. Later on, as the fœtus grows, new signs are developed. Place the patient on her back, with the shoulders a little raised, then strike upon the rounded mass of the uterus in front of the cervix with the tip of the finger, to elicit the phenomenon of ballottement; or if the os be patulous perform this experiment cautiously through the os. If we thus get positive evidence of pregnancy, we have gained an important step in the diagnosis of the case. But it must not be hastily concluded that because there is pregnancy there is not ovarian tumour. Both may co-exist. And if we fail to bring out any of the absolute signs of pregnancy it must not hastily be concluded that the woman is not pregnant. It is not a very uncommon thing, even in an uncomplicated case of pregnancy of three, four, or even five months, to miss the unequivocal signs. And there are cases, rare it is true, in which the pregnant womb is sunk out of reach in a large accumulation of ascitic fluid. This mostly happens in connexion with albuminuria, when there is anasarca as well.

Ballottement of an enlarged uterus, or of a tumour partly suspended in ascitic fluid, may so nearly simulate the ballottement of the fœtus suspended in the liquor amnii, that error is easy. The indication is never to rely upon one sign alone.

Before discussing the special or particular cases for diagnosis, it will be convenient to describe summarily the general principles of proceeding by which we determine the presence of an ovarian tumour. These flow partly from the knowledge acquired of the nature and progress of these tumours, and partly from the application of means of physical exploration.

The means at our command are:—

1. *Inspection of the Abdomen.* The patient should be on her back, with the abdomen, and at least the lower part of the chest, bare. We then note the shape, size, and position of the tumour. An ovarian tumour generally gives the abdomen an *arched form*, sometimes uniform, especially if the tumour be mainly monocystic; sometimes there is oblique or sloping form, one side being prominent, another depressed; this indicates polycystic tumour.

Very large tumours may rise under the ribs, push up the liver, and make place for themselves by everting the false ribs and cartilages. It is not uncommon to find the xyphoid cartilage protruded forwards. The recti muscles are sometimes parted; and the tumour, projecting forwards, may even find a resting place on the thighs and knees.

Generally the abdomen is in full tension, the skin is shining, sometimes marked by scar-like cracks, as in pregnancy. In the depending parts, especially that which hangs over the pubes, the skin becomes thick and doughy from infiltration of serum into the cellular tissue. This is sometimes so great as to give a brawny or hypertrophied character to the skin. Furrows and ridges are thus formed. This feature is rare in pregnancy.

The form of the abdomen depends upon the form of the tumour. If the cyst be single and its wall thin, so that it has yielded easily and uniformly to distension, it will tend to arch out in the direction of least resistance; that is, forwards, protruding the abdominal wall. The umbilicus, as in pregnancy, is pushed out, but the arching of the abdomen from below the xyphoid cartilage to the pubes, is even more prominent, generally, than is the bow produced by the pregnant womb. It even seems sometimes to point above the umbilicus. The walls of the gravid uterus are not merely stretched; they *grow*, and the uterus always preserves, more or less, its original shape, that is, it is pyriform, and compressed or flattened a little in its anterior wall. If the cyst is multilocular and the cysts are distended unequally, the form of the abdomen will be unequal but still, as one cyst, and that one which enlarges in the direction of least resistance, is sure to be most anterior, the general form is like that of the monocystic tumour. In the early stages there is commonly more prominence on one side of the abdomen, one iliac region being visibly more tumid than the other. By inspection, also, we observe the peculiar expression of countenance which attends so many cases of ovarian disease. This is often so striking as to be alone diagnostic to the trained eye. Wells* gives a drawing, taken from a photograph by the late Dr. Wright, which represents this very graphically. He calls it the "*facies ovariana.*" The emaciation, the prominent or almost uncovered muscles and bones, the expression of anxiety and suffering, the furrowed forehead, the sunken eyes, the open sharply-defined nostrils, the long compressed lips, the depressed angles of the mouth, and the deep wrinkles curving these angles, form together a face which is strikingly characteristic.

2. *Mensuration* gives more precision to what the eye has observed. Carry a tape from the spinal column round on either side to the umbilicus or linea alba. If the two semi-circumferences are unequal, this raises a presumption in favour of ovarian

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* "Diseases of the Ovaries."

tumour. Another measurement is perhaps more useful. Measure from each anterior superior spinous process of the ilium to the umbilicus, and also to the xyphoid cartilage. These comparative measurements will show clearly the greater protrusion of one side, if it exist. Mensuration is more valuable as a means of keeping a precise record of the increase or diminution of the size of the abdomen. The most precise results in measurement are obtained by aid of the *cyrtometer*. This instrument, consisting of bands of thin lead, enables us to take not only the distances between two points, but also to take a mould of all the intervening projections and depressions, which can be taken off in tracings for future comparison. Nothing brings out so clearly the differences on the two sides.

3. *Palpation.* By feeling with the outstretched hands, we get information as to the size, form, and solidity or waviness or penetrability of the abdomen. If the hands can be made to sink in a marked manner towards the spinal column below the umbilicus, the presumption against ovarian tumour, unless a very small one, is strong. If an ovarian tumour lie behind the abdominal wall, this is impenetrable. Fat, phantom-tumours, tympanites may thus be excluded, especially if we aid relaxation of the abdominal walls by anæsthetics, carrying the open hands all round the swollen abdomen. By gentle pressure we can often determine the outline of the underlying tumour; we make out the rounded cyst or bag which contains and confines, within definite limits, the fluid which is felt waving in it. This sense of a waving fluid is called *fluctuation.* It is most clearly brought out by placing one hand spread out, or one or two fingers, lightly, at one point of the tumour, whilst with a finger of the other hand we gently flip in another part. By shifting the positions of the observing and the striking hands, we explore the area of fluctuation and its degree in different parts. If the fluctuation be felt freely in all directions, of equal force, transversely, obliquely, longitudinally, along the extreme breadth and length of the tumour, the inference is justifiable, not that the tumour is strictly monocystic, but that the main volume of the fluid is contained in one cyst. In polycystic tumours the long axis is often oblique.

If we find there is fluctuation in one part of the tumour and not in another; if we find the fluctuation is different in force in different parts; if we find the wave propagated from one point is wholly or partially arrested in its spread across to another part of the tumour, we may infer the presence of septa or solid parts, and hence that the tumour is polycystic.

Plain as fluctuation often is, this sign is not free from ambiguity. I have known a solid fibroid of the uterus communicate a sense of fluctuation that imposed upon skilful observers. And we may have what may be called *double* *fluctuation.* There may be ascites as well as ovarian tumour. Or the fluctuation may be due to ascites. The latter case will be diagnosed by-and-bye. When, as not unfrequently happens, there is fluid in the peritoneal cavity as well as in an ovarian tumour, if the tumour be large, the peritoneal fluid will be diffused as a thin layer all over the tumour. Thus, when we first flip the abdomen, we may see and feel a light wave run along the surface. By pressing the fingers rather firmly and suddenly into the abdomen, we may displace the thin peritoneal stratum, and come down upon the resisting bag of the tumour; then, by giving a rather smart impact to another part, we may elicit the feel of another deeper fluctuation, that proper to the tumour. But even this is open to fallacy. Striking in this manner, we may, displacing the fluid in a cyst, come down upon a solid mass projecting into the cyst.

In pregnancy, also, when the uterine and abdominal walls are very thin, and the quantity of liquor amnii excessive, fluctuation may be as distinct as in some cases of ovarian dropsy.

We may also make the phenomena of fluctuation available in determining the limits of the sac. Thus, by applying two observing fingers spread out, so as to leave a space of two or three inches between their tips, to one flank, whilst impact is given by the other hand, we may feel fluctuation by the upper finger, and not by the lower one, showing that the boundary of the cyst is between the two fingers. It is very difficult, sometimes impossible, to differentiate the fluctuation of colloid matter from that of limpid fluid. The colloid tremor is propagated through a multilocular tumour without being sensibly affected by the intervening septa.

A form of palpation, sometimes decisive, consists in grasping the tumour between the hands, rolling it about from side to side, and *lifting it* up beneath the abdominal wall. This gives conclusive evidence of tumour. If this lifting be practised by an assistant whilst the operator keeps an observing finger on the cervix uteri, the uterus may be felt dragged up by the tension put on the pedicle.

Intra-vaginal touch is a form of palpation. By it chiefly, aided by the sound, we determine *the state of the uterus* and its relations to any complicating tumour. So long as the tumour is within the pelvis, the uterus is almost invariably in front, pushed forward. When the tumour has risen out of the pelvis it generally gets in front of or above the uterus. By touch we determine some of the physical signs of pregnancy, if existing. In advanced cases, where the tumour has assumed the balloon shape, and even the lower pole of it is too large to enter the pelvic brim, the uterus is often dragged up a little, and tilted on one side, generally to the opposite side of the tumour; the os is generally directed backwards, the fundus forwards. The vaginal roof is mostly covered in by the spherical pole of the tumour; it feels elastic if the tumour is monocystic, and sometimes fluctuation may be transmitted to it by flipping the abdominal wall.

The upward dragging of the uterus tends to obliterate or conceal the vaginal-portion of the uterus; it is drawn out of the vagina, so that the os uteri is often felt almost flush with the vaginal roof. The vaginal roof itself is sometimes drawn up into a cone. The body and neck of the uterus are sometimes greatly flattened and elongated. This is usually due to adhesion with the tumour, so that the tumour in its growth compels the uterus to spread with it. This is strictly analogous to the enormous hypertrophy to which, under like circumstances, the Fallopian tubes are subject. In the opposite class of cases in which the tumour, or a part of it, descends in Douglas's space, this space is much enlarged, the posterior vaginal roof is distended and made to protrude, sometimes so as to be prolapsed beyond the vulva.

The touch is extended by the *uterine sound.* But before using it we must first clearly exclude pregnancy. This instrument, passed into the uterine canal, determines—1, the length of the uterus; 2, its inclination or position; 3, its mobility or freedom from the tumour. If the uterus is easily moved, and of its ordinary size, it may be inferred, not only that the tumour is extra-uterine, but also that the pedicle is long.

Vaginal and rectal touch is further of great service in determining other questions, especially that of complication with malignant disease.

The information obtained from inspection and palpation is corrected and supplemented by that obtained from

4. *Percussion.* This is, perhaps, the greatest test. It may be said to be but a form of palpation, but it brings out information that mere palpation could not supply. By percussion we determine the areas of dulness and of resonance. In ovarian cystic tumour the relation of these areas is characteristic. The tumour, arising from one iliac fossa, pushes the hollow intestines over towards the opposite side. Whilst the tumour is small, that is, not so large as to reach the level of the umbilicus, the contrast between the dulness of the side where the tumour lies, and that where the intestines are driven to, is marked. When the tumour is so large as to reach the scrobiculus cordis this contrast is not so obvious; but it may almost always be traced. The intestines lie in the space between the last false rib and the crest of the ilium and back to the spinal column, because the cyst, occupying the opposite side of the abdomen, has left only this space for the intestines to retreat to; and has not driven them directly and all upwards, because it grew, always

occupying a more or less lateral position. The contrary of this happens in pregnancy and ascites, in which conditions the intestines are driven straight and gradually upwards, the gravid womb rising from the centre, and ascitic fluid filling the lower parts, to rise with its level uniformly upwards. Hence we have in cystic tumours resonance on one side, between the last false rib and the crest of the ilium, whilst on the opposite side the dulness is more extensive, because the cyst is there. So much may be taken as generally true, but we must guard against fallacies.

In pregnancy, as in ovarian tumour, the intestines are so crowded back that, whatever the position of the patient, the dulness is heard all over the front of the abdomen, whilst there is an area of resonance in both flanks. In advanced pregnancy there is often marked obliquity of the uterus; it inclines so much to one side that the area of resonance in one flank may be notably smaller than in the other. And in ovarian tumour we almost invariably find some resonance in both flanks; although the resonant area will be greater on one side.

5. *Auscultation* is chiefly of use in determining the presence of pregnancy. It is true that by it we may detect a friction-sound, produced by the ascent and descent of the tumour under the respiratory movements; and sometimes a blowing-sound in one groin, which might impose for the *souffle* of pregnancy. But these signs are of minor clinical value. Some variety of vascular murmur is much more common in uterine tumours than in ovarian. It is synchronous with the pulse.

Nor does the difficulty end here. Two or more of the above cases may co-exist. After discovering the existence of some one of the conditions enumerated, we may overlook a complication which is masked by the prominence of that which we have discovered. For example, just as ovarian tumour may be complicated with pregnancy, so it may be complicated with uterine fibroid, or with ascites. Nor is it enough to determine the presence or absence of complicating tumours or fluid collections. When we have settled that there is an ovarian tumour and nothing else, it is still important, with a view to forming a prognosis and the selection of the mode of treatment, to determine—1, Whether the tumour be monocystic or polycystic; 2, whether it be benign or malignant; 3, whether or not adhesions have been contracted with the abdominal walls and viscera; 4, whether the uterus be enlarged, or in any way involved; 5, the condition of the general health, and especially the presence or absence of diseases of other organs, as of the heart, lungs, liver, kidney.

A sound judgment as to these points will greatly influence the choice between tapping, extirpation, or expectation.

Diagnostic research must be applied to the solution of the following problems :—

a. Is there a uterine pregnancy ?

b. Is there an extra-uterine (ectopic) pregnancy ?

c. Is there an extra-ovarian cyst ?

d. Is there enlargement of the uterus from fibroid tumour or fibro-cystic tumour ?

e. Is there enlargement of the omentum and intestines ?

f. Is there enlargement of the spleen, liver, pancreas, or kidneys ?

g. Is there pelvic cellulitis or peritonitis or hæmatocele ?

h. Is there ascites or encysted peritoneal dropsy or abscess ?

i. Are there adhesions ?

j. Is the tumour benign or malignant ?

k. Is there distension of the bladder or fæcal accumulation ?

It follows from the foregoing discussion that to enter properly prepared upon the task of diagnosing ovarian tumour, the inquirer must have a good clinical acquaintance with thoracic and abdominal pathology.

a. Is there a uterine pregnancy? This initial question has been already discussed.

b. Is there an ectopic pregnancy? This question trenches to some extent upon the first, *a;* but it involves many points quite distinct from uterine pregnancy. Ectopic pregnancy is rare ; but for this very reason, and also because the seat of the tumour which it forms is more nearly identical with that of ovarian tumour, the diagnosis is more difficult. The diagnosis between extra-uterine gestation and ovarian tumours is discussed in Chapter XIII. on "Ectopic Gestation." But it is useful to add here that in some cases of abdominal gestation, there may be so much fluid in the sac that the fœtus cannot be felt in the dorsal or erect positions. But in the knee-elbow position the fœtus may fall down to the front, and give ballottement. Another point is that in extra-uterine gestation the sac usually projects lower in the recto-uterine pouch than in ovarian tumour.

It must not be lost sight of that ovarian tumour may be complicated with pregnancy, uterine or extra-uterine. In the case of uterine pregnancy we may expect to make out the positive signs of pregnancy; but these will be likely to mask those of the ovarian tumour. One characteristic of the double condition is that the abdomen is more widened out than in either of the single conditions; and we may usually define by palpation, percussion, and auscultation the limits of each tumour. There is commonly a marked sulcus or depression at the upper part, where the two spheres diverge, as shown in the diagram, Fig. 87. By auscultation we may commonly mark the seat of the fœtus.

In ovarian solid tumours it almost always happens that the tumour is of irregular form. There are projections, angles, sometimes simulating limbs of a fœtus; but they do not move; nor do we feel that peculiar vermicular movement characteristic of the gravid uterus.

If the uterus be at all fixed, and any hardness be felt around it, examine by rectum as well. If malignant, projections hard and irregular, will probably be felt more plainly here.

c. Is there an extra-ovarian cyst? When by internal and external examination, no nodular hardening of the cyst wall can anywhere be detected, where the cyst is uniformly smooth and elastic over its whole surface, where the wave of fluctuation is equally perceptible in all directions, the inference is strong that the cyst is practically unilocular; and if in a young person it is either flaccid and of long duration, or excessively tense and of recent formation, the inference is almost equally clear, that the cyst is extra-ovarian and the contents limpid.

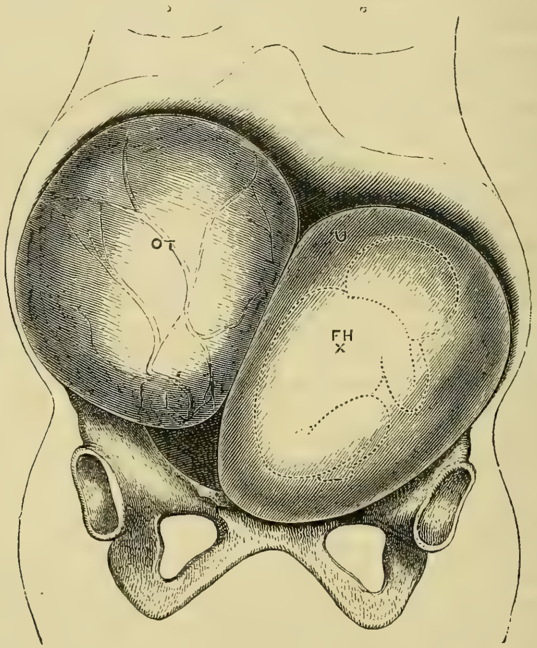

Fig. 87.

OVARIAN TUMOUR AND PREGNANCY.

O T, the tumour lifted out of the pelvis by the uterus, U, which is pushed over to the side and over the brim of the pelvis; F H, spot where fœtal heart may be heard (R. B.).

It is a good rule in any case presenting the above characters to tap in the first instance, as this operation may be sufficient to cure.

d. Is there enlargement of the uterus from fibroid tumour or hydrometra? This is one of the great practical questions.

Under the belief that an ovarian tumour existed, the abdomen has many times been laid open, only to discover what should have been known before, namely, that the tumour was uterine. The diagnosis is not seldom extremely difficult, and especially so when the tumour is fibro-cystic, that is, containing fluid so superficially placed as to yield the phenomenon of fluctuation. The uniformly solid tumours ought rarely to deceive, so far as to carry one into the practical error of opening the abdomen. Uniformly solid ovarian tumours are so rare, whilst uniformly solid uterine tumours are so much the rule, that if I were disposed to be aphoristic, I would submit no aphorism with less hesitation than this: If you find a smooth, solid tumour, beware: it is uterine. If a solid tumour of the ovary be rare, a large solid tumour, so large as to give rise to question of operating, may be said to be amongst the curiosities of pathology.

In seeking to determine whether a tumour be uterine, we must be governed greatly by what vaginal and rectal exploration teaches as to the condition of the uterus. The great point is to determine whether the tumour felt above the pubes is continuous or identical with the uterus. This is done by the immediate touch by finger *in vaginâ,* by mediate touch by sound *in utero,* separately and combined with palpation by hand outside on the abdomen. If, by these means we ascertain—1, that the uterine cavity much exceeds two and a half inches in length; 2, that the course of the uterine canal is tortuous (a flexible bougie, which will worm its way along a tortuous canal, is sometimes better than the metal sound); 3, that the body of the uterus is directed backwards; 4, that the bulk of the tumour moved by the hand outside communicates a continuous movement to the cervix, as felt by finger or sound—we may fairly infer that the tumour is uterine. This inference will be strengthened if the tumour be of very long standing; and if the patient have suffered from frequent metrorrhagia.

But it is right to declare frankly that we cannot always elicit these phenomena, although the tumour is fibroid; and that some of them, when elicited, are not absolute proof that the tumour is ovarian. I have pronounced a tumour to be ovarian, influenced by the apparent separate mobility of uterus, in a case where the tumour proved to be uterine. This sign is very deceptive. The great bulk of the uterine tumour may be connected with the uterus by a comparatively narrow portion below. At this narrowed point the portion of uterus below it may easily move upon the great mass above, which is comparatively fixed by its volume and solidity. I think it may be affirmed with some confidence that a large abdominal tumour is uterine if we get a combination of the following conditions: 1, absence of the *facies ovariana;* metrorrhagia; solidity of the tumour; descent of any considerable mass into the pelvis;

deviation of the os uteri; distortion of the lower part of the uterus; and especially if with the above, the sound travels to an abnormal distance. Or, in other cases, when the vaginal-portion is effaced, the os uteri forms the centre of a rounded hard mass resting on the pelvic brim.

It is not very uncommon to find a complication of fibroid of the uterus with ovarian tumour. In such a case we must carefully weigh the evidence showing that both organs are implicated.

An ovarian tumour of moderate size, especially if in great part solid or semi-solid, may closely simulate a uterine fibroid, if there be great thickness of the abdominal wall. A thick mass of fat intervening between the examining hands and such a tumour will often effectually mask the two great distinctive features of an ovarian tumour, namely, fluctuation and irregularity of surface. We must depend upon careful examination of the uterus by the vagina, isolating, if possible, this organ from the tumour, aided by abdominal palpation under chloroform, to establish a diagnosis. The *facies uterina* differs from the *facies ovariana.* The general health is often less affected in uterine tumour unless hæmorrhage attend. Very deep sulci between masses of tumour, especially if these masses be hard, are more characteristic of fibroid tumours. Small marble-like tumours sessile or pedunculated on the main mass are strongly suggestive of fibroids.

Dr. C. C. Lee has collected nineteen cases of fibro-cystic tumour of the uterus; and has analyzed them, with the view of establishing grounds of diagnosis between it and ovarian tumour.* As proof of the difficulty of diagnosis, it is stated that in one only was the true nature of the tumour ascertained before operation. Koeberlé, however, thinks the diagnosis may be established by the following signs:—1. The discoloured hue and dejected expression of the face, the so-called *facies uterina* of the patient. 2. The variable consistency of the tumour, as made out by abdominal palpation. 3. The results of tapping. If the trocar touch a fibrous spot in the tumour-wall, blood will flow; even when the cyst is reached the fluid never presents the clear viscid character of ovarian cystic fluid, but is either yellowish, thin, serous, and rich in lymph or cholesterin, or it is brown, muddy, sero-purulent, or bloody, and the tapping leaves only partial collapse. 4. The indurated or nodular feel of the tumour after tapping. 5. The uterine connexions of the growth, as made out by vaginal uterine examination, by aid of the sound. The uterus is more displaced than in ovarian tumour.

The history, although liable to deceive, must be taken into account. The rate of development of ovarian tumours usually gives less than two years, whilst that of fibro-cystic tumours is generally much slower. Ovarian tumours begin early, uterine late. But the variations are numerous.

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* "New York Journal," 1871.

The fluctuation in fibro-cystic tumours is confined to certain regions, generally to the upper part, and the solid portions preponderate; whilst in ovarian tumours having solid elements, the fluctuating parts predominate, and the solid element is almost always at the lower part. The characters of the fluid drawn by aspiration may offer valuable aid.

We must, however, be prepared to find all the above signs giving, at best, ambiguous indications. The signs most common in fibro-cystic tumour may be present, or appear to be so, in ovarian tumours, and *vice versâ*. Where doubt is unavoidable, error is excusable. Hence we are occasionally driven to the exploratory incision, and to the direct examination of the tumour. This gives another order of signs. If the tumour be uterine, the exposed mass is dark, vascular, thick, and frequently fasciculated with fibrous bands. If it be ovarian, the sac is usually pearly white, or blue and glistening. But these appearances again I have seen interchanged. More than this, even after removal from the body, tumours believed by the operator to be ovarian have turned out to be fibroid outgrowths from the body of the uterus, more or less pedunculated. Some of the largest tumours which have been the motive for laparotomy have been fibroid or fibro-cystic tumours of the uterus; and more than a hundred cases are on record where the abdomen has been opened with the object of removing an ovarian tumour, when the operator discovered that it was uterine. The uterus may be enlarged from a collection of watery or mucous fluid, constituting *hydrometra*. There is a specimen in Guy's Museum, described by Wilks, of a uterus as large as the gravid organ at seven months from this cause. Being of very slow development, not answering to the progress of pregnancy, of which state also the ordinary signs are wanting, such a case might simulate ovarian dropsy. This probability adds force to the rule to explore the uterus by sound in every possible case. *Hæmatometra* presents analogous conditions. When due to vaginal atresia, there is small likelihood of error. *Physometra* usually follows childbed; and the resonance ought to prevent error.

e. Is there enlargement of the omentum and intestines? At the climacteric age, a woman, falling off perhaps in health, notices with alarm that she is increasing in size. She fears that it is due to a growing tumour. The phantom-tumour or pseudocyesis of the climacteric period has been already discussed. We have now to eliminate fibroid and ovarian tumours. Where there is nothing but fat and inflated intestines, we may always exclude *large* fibroids and ovarian tumours by palpation and percussion. Resonance in front may be dulled, but still the sound is different from the dead sound returned on percussing over a solid or fluid tumour. The hands will sink in towards the spine, on firm pressure, especially if the abdominal muscles are made to relax under chloroform or under expiration. The sensation to the hands is doughy, not resisting. The condition of the uterus can commonly be determined by vaginal examination and by sound, so as to leave only the possibility of ovarian tumour to investigate. And here we come to the practical difficulty of excluding a *small* ovarian tumour. This may be buried in one iliac region, so much masked by surrounding fat, that neither by external nor by internal touch can we get at it so as to bring out distinctive characters. It may help us to remember that women who are storing up fat do not commonly have ovarian dropsy or pregnancy. These states usually cause emaciation. Some of the most difficult cases to diagnose are those of *malignant growths* from the omentum. They may attain enormous bulk. Sometimes they may be turned out after separating adhesions. I removed such a mass, weighing 28 lbs. The woman recovered; but another mass developed. This I removed in the following year. It weighed 22 lbs. She recovered from this operation also; but sank some months later from the development of fresh growths. These growths are generally of irregular shape; fluctuation is indistinct or wanting; and the aspirator-trocar draws nothing, excepting perhaps a few drops of blood. They are more likely to be extensively adherent than ovarian tumours.

When the uterus is fixed, by the matting together of the structures at the brim of the pelvis, whether with or without extensive ascites, the case is likely to be malignant.

f. Is there enlargement of the liver, spleen, pancreas, or kidney? Tumours of the stomach, liver, spleen, or pancreas may in most cases be eliminated by evidence showing that they grow from above downwards. This may generally be obtained by percussion. If dulness prevail from the ribs downwards, leaving an area of resonance below the tumour, that is, between its lower margin and the pelvis, the inference that the tumour is not of pelvic origin is nearly certain; and this probability is greatly increased if the tumour be solid; and generally the lower edge of the liver can be made out well-defined, the fingers even able to penetrate beneath it. The hydatid of the liver is the condition most likely to deceive. Here we may have fluctuation and dulness over an area sometimes very similar to that occupied by an ovarian tumour. The history and the peculiar features of the disease will supply diagnostic indications. We shall generally have a resonant space below the tumour. The hydatid tremor or thrill may be felt. Fluid drawn by aspirator-needle would show hooklets of echinococci, and its specific gravity would be below 1010.

I have known a considerable area of resonance between the pelvis and a tumour seated under the liver, which proved to be ovarian. This had been carried up and rolled over on its axis, the pedicle stretching and twisting under the pressure of a growing gravid uterus.

Spiegelberg relates* a case of echinococcus of the right kidney, mistaken for ovarian tumour, and operated upon with a fatal issue. The tumour extended from the ribs to the pelvis, and was felt by vagina. In reading this case it appears to me—so easy is it to criticise after the event—that the tumour was more strictly confined to one side than is usual in ovarian tumour. It extended all along the right side from ribs to pelvis, but did not much overlap the median line.

Cystic disease of the kidney has given rise to mistakes. So long as the tumour formed by this disease is comparatively small, danger of mistaking it for an ovarian tumour is not great. The dulness and fluctuation are more limited to one lumbar and hypochondriac region; and an area of resonance will be made out between the tumour and the pelvis. But when the cystic enlargement is very great, extending across the abdomen and below to the pelvis, the diagnosis is not easy. Renal tumours growing from behind press the intestines forward, so there is resonance in front. Babington and Bright pointed out that in renal disease we may expect changes in the urine, especially an abundance of phosphates and lithates. A very small ovarian tumour, with a long pedicle, might be mistaken for a floating kidney.

In 1877 I saw a case with Mr. Christopher Heath, which he operated on under our joint diagnosis that it was ovarian. It proved to be a renal cyst caused by impaction of a calculus in the ureter. This calculus had been felt through the abdominal wall. The patient survived the operation ten days.

g. Is there pelvic cellulitis or peritonitis or hæmatocele? Here a history of sudden or rapid development under symptoms of local and general distress will, when given, generally be sufficient. But often cases come before us with no history, or only a misleading one. In these it requires great care to distinguish a consolidated mass of omentum or intestines found near the pelvis from an ovarian tumour. This condition has frequently deceived, even to the extent of inducing the surgeon to open the abdomen. The distinction will rest mainly upon the more solid character of the inflammatory consolidation, the absence of fluctuation, and perhaps the presence of deadened resonance from intestine entangled in the mass. Here again the aphorism which warns to be suspicious of a solid tumour finds useful application.

It is also necessary to remember that peritonitis or hæmatocele may supervene upon ovarian cystic disease. In the first case, that of peritonitis, it is singular to observe how an area previously yielding distinct fluctuation, becomes hard, almost solid, from the effusion of plastic matter on the surface of the tumour. Where there has been no opportunity of examining before the inflammation set in, it is not easy to avoid the error of concluding that there is a solid tumour under the hand. In the absence of antecedent knowledge of the real nature of the tumour it is only by waiting until the inflammatory complication has to a great extent disappeared, that we can be sure of our diagnosis.

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* "Archiv für Gynäkologie," 1870.

In the second case, that of hæmatocele, the sudden access of grave symptoms at once arrests attention. Where there is an ovarian tumour the source of the effused blood is likely to be the tumour itself. Its walls, or large vessels on its surface, may have burst. Abdominal shock is the first result. If the patient survive this, peritonitis, diffuse or limited to the pelvic region, follows. This will give rise to a firm tumour felt projecting into the rectum and vagina, probably rising out of the true pelvis in one or both iliac fossæ, and pushing the uterus forward against the symphysis pubis.

For the distinctive characters of retro-uterine hæmatocele and other retro-uterine tumours I must refer to the chapter on this subject.

Pelvic cellulitis may be confounded with ovarian tumour under two conditions: first, where there is tumour only; and secondly, where there is a tumour which has burst, and is discharging purulent matter. In the first case, the history is important. Pelvic cellulitis is usually of recent formation. It has come on with acute symptoms after labour, abortion, suppressed menstruation, surgical treatment, or other accident; it sets the uterus fast in a collar or framework of hard effusion in the brim of the pelvis, so that the body of the uterus cannot be distinguished. The uterus is not so affected in ovarian tumour. If there be fluctuation, there is commonly redness of the skin and the peculiar œdematous feel of the tissues where the fluctuation is due to abscess. The pelvic distress, including dysuria, is marked in cellulitis, rarely so in ovarian dropsy.

Where there is escape of pus, this may be due to the perforation of a suppurating ovarian cyst. But this is a rare event; whilst it is a frequent issue of pelvic cellulitis. And it usually occurs within a few weeks of the commencement of pelvic cellulitis; whereas it is extremely rare for an ovarian tumour to suppurate and discharge until it has attained a large size, that is, until it is of considerable duration. But these features, clear enough when the whole course of the disease has passed under our observation, are not so clear if we are called to a case of long standing. For example, although pelvic cellulitis usually runs a tolerably definite course within a short time, cases occur where abscesses burst after some months, or at least in which suppuration goes on, and matter is discharged for months together by the vagina or rectum. It is not always easy, under such circumstances, to decide that the source of the pus is not an ovarian cyst; especially as a cyst, during the process of suppuration and perforation of the vagina, is likely to have set up pelvic peritonitis. This complication may be very puzzling; and we shall often be driven to the history for data upon which to found a presumption one way or the other. The necessity, however, of forming a precise diagnosis in such case is of minor urgency, since even if we attained to the certainty of its being ovarian, the high probability of extensive pelvic adhesions would forbid the attempt at extirpation.

h. Is there ascites, or peritoneal encysted dropsy, or abscess? The distinction between pure ascites and pure ovarian dropsy is rarely so difficult as to induce error. But the two conditions are so frequently associated that the subject demands discussion. The grand characteristics of ascites are: that if the patient be on her back, the intestines floating anchored to the mesentery, there will be clear resonance in front, where in ovarian dropsy, pregnancy, and fibroid of the uterus there is dulness; that the dulness will be in the lumbar regions between the false ribs and the crests of the ilia, where the fluid gravitates, and where there is resonance in ovarian dropsy and pregnancy; that the areas of resonance and dulness will shift on changing the position of the patient, because the hollow intestines float to the surface, whereas in cystic dropsy and pregnancy these areas do not shift. If percussion be performed, the patient lying on her back, the fluid in ascites gravitating to the flanks, and the intestines floating up to the front, the areas of resonance and dulness will be as in Fig. 88. In ovarian dropsy, the areas of resonance and dulness will be exactly the reverse, as in Fig. 89, and will not vary under change of posture.

A striking contrast between ascites and ovarian tumour may also be demonstrated by percussing in the erect posture. In ascites the line of demarcation between dulness and resonance is concave, whilst in ovarian tumour it is convex. This contrast is seen in diagram, Fig. 90.

In ascites, when lying on the back, the flanks widen, bag out, whilst the belly becomes flatter. In ovarian dropsy the prominence is preserved. In ascites again the abdominal walls are more even in outline, softer, and more yielding.

Again, ascites is the consequence and therefore a symptom of disease of the heart, liver, or kidneys. The history and other symptoms of these diseases will guide to a right appreciation of the dropsy.

There is a form of *encysted dropsy*, the result of peritonitis, in which the peritoneum of the pelvic organs may or may not be involved. Peritonitis may be greatly limited to a portion of

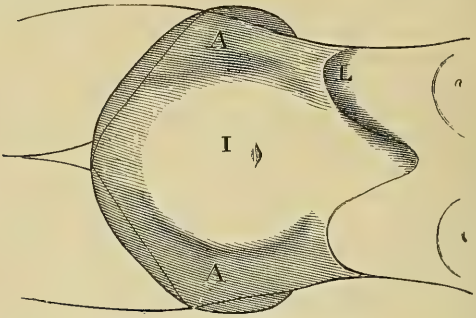

FIG. 88.—DORSAL DECUBITUS (R. B.).
A. Ascitic dulness. I. Intestinal resonance. L. Liver.

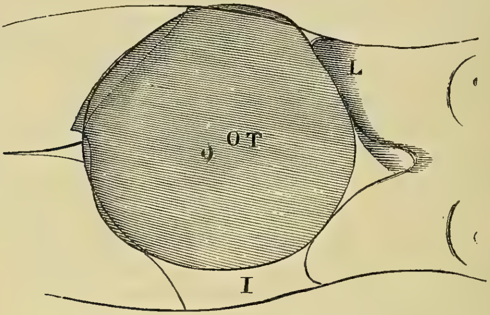

FIG. 89.—DORSAL DECUBITUS (R. B.).
O T. Dull area of ovarian tumour. I. Intestinal resonance. L. Liver.

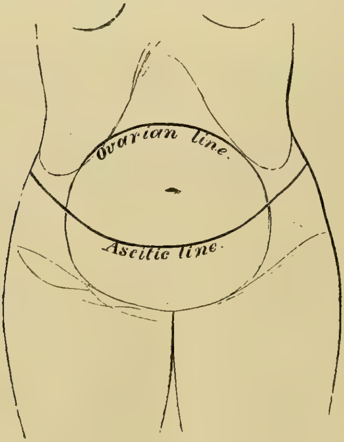

FIG. 90.—DIFFERENTIAL CHARACTERS OF OVARIAN AND ASCITIC DROPSIES IN UPRIGHT POSTURE (R. B.).

the omentum, and of the small intestines covered by it. Plastic matter may be so thrown out as to form a cavity or cyst between these parts in which serum is imprisoned. I saw a case which I concluded to be of this kind some years ago in consultation with Dr. Clapton and Mr. Litchfield of Twickenham. There was a large tumour in the right flank, passing across the median line, and giving fluctuation, which could be traced downwards to the iliac fossa. It had been looked upon as certainly ovarian. The circumstances that made me doubt were the rapidity with which the tumour had formed; the severe attendant pain and history of fever; a certain singular thickness and doughiness of part of the walls; and the more marked lateral site of the tumour than is usually found in ovarian cysts. I punctured the cyst; and in doing so it required some confidence in one's diagnosis, for the trocar had to be made to penetrate considerably deeper than is usually necessary in the case of ovarian cysts which lie close behind the abdominal wall. A quart or more of horribly stinking putrid serum escaped, so that we suspected there had been a perforation of the intestine into the peritoneum as the cause of the inflammation. The entire disappearance of the tumour and recovery of the patient lent confirmation to the diagnosis arrived at.

The general features of encysted dropsy of peritoneum are thus summed up: The fluid lies (in front of) above the intestines, these being bound down by adhesions; it sometimes extends over the whole anterior aspect of the abdomen, being divided into several chambers, while in other cases it is bounded by narrow limits. Depressions are sometimes felt on the surface corresponding to the dissepiments, if there be any. The abdomen is not prominent, but flat. Fluctuation is weak and limited, and does not change its relations on changing the position of the patient. It does not interfere with respiration or digestion like an ovarian cyst, and is never attended by œdema of the legs or enlargement of the abdominal veins. The fluid drawn by aspirator will contain flakes of fibrin and will coagulate by heat.

Encysted peritoneal abscess may simulate ovarian dropsy. Thus a case was admitted under my care at St. Thomas's, in which a tense, obscurely-fluctuating tumour was traced from the right side of the pelvis, rising as high as the umbilicus, and passing the median line to the left. The uterus was three and a half inches long; its fundus deflected to the left by the swelling in the right of the pelvis; the cervix was pushed forward near the pubes. In the fundus of the vagina, on the right of the cervix uteri, was a tense, stretched, elastic, smooth depression. The tumour had, the patient said, all formed within a month. Its onset was not marked by any acute symptoms. But when admitted there were signs of irritative fever; the pulse was about 100, the temperature ranged from 100° Fahr.

to 104° Fahr. The physical signs could hardly be distinguished from those of ovarian tumour; but the rapidity of formation, and the signs of irritative fever, pointed to the diagnosis of a perimetric abscess. I accordingly punctured by the vagina with the aspirator-trocar. Fifty-eight ounces of offensive pus were drawn off; the tumour subsided, and the uterus returned to its normal position. More pus formed, which was again drawn off. The woman died of peritonitis and septicæmia. The diagnosis was verified, in so far that an encysted abscess was found. But a small ovarian cyst, which appeared to have ruptured, was imbedded in the abscess.

In connexion with ovarian cysts it is desirable to refer to certain *cysts occasionally found on the external surface of the uterus,* and described by Huguier. Two cases he described were the result of metro-peritonitis. I have seen several similar examples, mostly in connexion with malignant disease, and where obvious indications of recent or old peritonitis existed. I have, however, seen other examples of cysts containing serum seated on the peritoneal surface of the uterus, on the broad ligaments and ovaries in which association with inflammation or cancer could not be proved. Dr. McClintock also has referred to cysts attached behind the uterus.

Another form of *ascites* is that *which attends upon malignant disease* inducing peritonitis. Here the evidence of malignant disease will commonly be marked; and we shall miss the characteristic signs of encysted dropsy.

It is the *complication of ascites with ovarian cystic disease* which is often puzzling. If the ovarian tumour be small, and the ascitic collection large, the tumour is easily overlooked. On the other hand, if the tumour be large and the ascitic collection small, the tumour alone may attract attention. In the latter case the practical consequences of mistake may not be serious, because the ovarian tumour is the disease that rules the choice of treatment, the ascites being secondary. In the first case, if there be urgent distress from accumulation of fluid, tapping by the aspirator-trocar would be indicated; and then, the fluid removed, the tumour would come under manipulation.

i. Are there adhesions? This is often an exceedingly difficult point to determine. I have seen extensive adhesions where it was confidently foretold that there were none. Accurate diagnosis is not so important as it was at one time thought to be. Abundant experience has now proved that moderate adhesions offer no serious difficulty in carrying out extirpation, and do not jeopardize the recovery. Extensive and intimate adhesions, especially to the lower surface of the liver, to the intestines, and to the pelvic cavity, will sometimes altogether frustrate the operation, or the injury inflicted in overcoming them may be so great as to prove fatal. But adhesions at these points cannot be diagnosed, so that in practice we are often compelled to disregard the possibility of their presence.

The tumour may be presumed to be free from adhesions if—

1. There be no history of antecedent severe pain pointing to attacks of peritonitis. But this cannot be trusted. After recent adhesions a fremitus may be felt under the hand, a friction-movement, as the tumour rises and falls under respiration.

2. If we pinch up folds of the abdominal wall, or make the abdominal wall slide over the tumour.

3. By inspection in the semi-prone position, watching the effect of respiration: if, on inspiration, the tumour is seen to glide downwards beneath the abdominal wall, and to glide up again on expiration.

4. If on moving the patient, first to one side then to the other, the tumour be seen or felt to fall to the dependent side.

5. If the uterus be small and move freely under examination by finger and sound, the presumption is against pelvic adhesions.

6. If we can make out a thin layer of ascitic fluid, giving a wave superficial to the tumour, we have, perhaps, the best evidence of absence of adhesions.

7. Adhesions are less likely to be present if the tumour is benign; more likely if the tumour is malignant.

Owing to the free peristaltic and other movements of the small intestines, adhesion of them to the ovary is comparatively rare.

All the signs of free movement of the tumour may be found, and yet there may exist extensive adhesions. These may have become gradually drawn out by the advancing growth of the tumour, have become elongated, partly atrophied, so as to admit of free movement, but yet to give some trouble to separate when an attempt at extirpation is made.

j. Is the tumour benign or malignant? In seeking to determine this question, we shall derive assistance from the history, aspect, and constitutional condition. If the aspect be clear, and the general health not impaired beyond what can be attributed to the mere bulk and pressure of the tumour; if there be free fluctuation; if the uterus be capable of being isolated from the tumour; if we find the tumour free from adhesions, it may be presumed that the tumour is benign.

k. Two other conditions, which may possibly give rise to error, are *distension of the bladder* with urine, and *fæcal accumulation.* For the distinctive features of these conditions consult Chapter III. and Fig. 38. If the rule to pass the catheter before exploring further be observed, this error will be avoided.

It is not easy, however free and universal the fluctuation may be, to predicate that *the tumour is monocystic.* Indeed, monocystic tumours are so rare that it is scarcely worth while to contemplate the probability of any given tumour being of this kind. It is almost always a safe prophecy to say that it is polycystic. A single cyst will, *ex necessitate rei,* be perfectly uniform on its surface, and of spherical or ellipsoid form. Deviations from these characters, or variations in degree of fluctuation, or in the rate of growth in different parts, are conclusive against a single cyst.

The tumour is probably malignant, if it have grown rapidly; if the aspect be earthy, sallow, and of characteristic malignant cachexia; if emaciation be very great; if very irregular, knobby in form; if the uterus be found fixed to it; if irregular protrusions be found behind the uterus; if on rectal examination—which should never be omitted where malignancy is suspected—these projections into the rectum be more plainly felt; if the vaginal or other glands within observation be enlarged and hardened; if there be any considerable amount of ascitic fluid, and especially if there be œdema of the legs, with or without phlegmasia dolens.

The *recognition of ovarian tumour in the earliest stage* is especially difficult. Very little distress may attend the early growth. Practically, it rarely happens that the case comes before us until a tumour of considerable size has formed. The first inconvenience that attracts attention is the increased size of the abdomen; and this is often more annoying for moral than for physical reasons. An unmarried woman is visibly increasing in size, and censorious people whisper away her character; and if dependent upon her own exertions, she is unable to find employment. But sooner or later physical distress from pressure is pretty sure to follow.

When a small cyst containing fluid has formed, we may feel a smooth, rounded, tense body stretching the roof of the vagina on one side of the cervix, or a little behind. Small cysts get into Douglas's pouch, causing some amount of prolapse of the vagina. By bi-manual palpation we may possibly define the tumour, and even make out fluctuation. In this stage, a cystic ovary may be mistaken for a Fallopian gestation, or a dropsy of the tube. In either event the uterus may be so pushed forwards by the tumour as to obstruct the bladder and cause retention of urine, as in the following case:—A young woman applied as an out-patient, complaining of retention of urine. In accordance with our practice in such cases, she was at once sent to bed. I found the os uteri pressed close behind the symphysis pubis; after drawing off the urine I passed the sound into the uterus; it went in the normal direction forwards, and the fundus was felt just above the symphysis. This made it clear that the uterus of normal size was pushed bodily forwards by something behind it. Exploring with the finger to the sides of, and behind, the uterus, the vaginal roof was felt stretched out, and a tense elastic, defined swelling with fluctuation was made out by vagino-abdominal touch. The swelling did not rise above the pelvic brim, and except by the two-handed mode of examination it could hardly have been distinguished. I concluded that it was an incipient ovarian cystic tumour; and, since it was causing serious, even dangerous, pressure upon the bladder, I punctured it through the roof of the vagina by the aspirator-trocar, and drew off about six ounces of limpid lemon-coloured serum. The uterus then retreated to near the centre of the pelvis, leaving the bladder. No bad symptom followed; but after some days there was again retention; the uterus was again pushed forwards against the pubes. I repeated the operation, this time drawing off about two ounces of fluid, and injected an ounce of tincture of iodine, hoping that a cyst so small might contract and be cured. For a time the patient seemed to be doing well; but irritative fever set in, and ended fatally. Unfortunately a post-mortem examination could not be made. We have since had another case in the hospital of retention of urine caused by a small ovarian tumour.

Difficulty of diagnosis between early cystic tumour of an ovary, tubal gestation and dropsy of the Fallopian tube, is the less to be regretted, because puncture by the aspirator-trocar is probably the best treatment in all these cases. It should be performed in all cases where the prevailing character of the tumour is solidity, and where the fluctuation is obscure and limited.

The fluid drawn off should be carefully examined. It sometimes gives diagnostic evidence. Spencer Wells says, in the case of uterine tumour, it is not the viscid mucoid fluid of multilocular ovarian disease, but a thin serum containing 5, 10, or 15 per cent. of blood intimately mixed with it. If we get fluid of this character or none, the idea of laparotomy should be abandoned, unless, indeed, we are prepared to undertake the extirpation of the uterus.

A rare instance of difficult diagnosis arose in a case related by Disse (*Monatsschrift für Geburtskunde*, 1857), in which an ovarian cyst formed part of a femoral hernia.

Assuming the tumour to be ovarian, *which side did it start from?* Whilst the tumour is of moderate size this can sometimes be told by the canting of the uterus. The ovary rising out of the pelvis drags up the uterus, so as to throw the fundus over to the opposite side. This canting is determined by finger and sound. Sometimes this canting can be increased and made sensible to the finger placed on the cervix, by lifting up the tumour by pressure from below it through the abdominal walls.

Especially whilst the tumour is of moderate size, measurements taken from the umbilicus to either superior iliac process will probably differ by the tumour-side being the longest.

Tapping and Exploratory Incisions.—After exhausting all ordinary diagnostic methods, the indication to relieve from distressing symptoms and danger to life may still be so urgent that we are justified in resorting to certain operations in order to attain the precise knowledge necessary to direct ulterior proceedings. These operations are tapping and exploratory incisions.

Tapping, indeed, is an operation of old standing. For a long time it was the only proceeding employed to relieve the distension and other urgent symptoms. The operation was looked upon simply as a palliative, and occasionally it turned out to be curative. Now there is added a diagnostic value. When a tumour, apparently monocystic, is emptied of the greater proportion of its fluid, the cyst which contained this fluid collapses, and the operator can press his hand down upon the base of the tumour and feel what remains. Sometimes, but rarely, we may feel nothing; the tumour has to all evidence gone. In these cases the doubt is reasonable that the cyst was not ovarian, but a simple cyst of the broad ligament. In such a case the tapping may prove curative as well as diagnostic. The cyst-walls may shrivel up, cease to secrete, and finally become atrophied. It is in such cases that the injection of iodine is likely to be followed by cure; and it must often remain doubtful whether the iodic injection was not superfluous. Or we come to the conclusion that there is no cyst at all: that the case is one of ascites. The peritoneum emptied, we can now examine the state of the liver and other abdominal viscera more easily; we may find tubercular or other disease of the lumbar and pelvic glands.

It is not always easy to determine that there is no cyst. Its walls may be so thin, and so adherent to the abdominal wall, that incision may go through the cyst-wall without this being identified.

In other cases, and these by far the most numerous, when fluid ceases to run by the canula, we come down to a residual tumour more or less solid, more or less bulky. If there remain a considerable mass bulging up behind the abdominal wall on one side, or near the pelvis, and presenting fluctuation, we may diagnose another cyst, and the trocar may be used to puncture this, and even another in succession, or we may explore through the canula by a sound to ascertain the condition of the tumour. Here the polycystic character is beyond doubt. And the therapeutical conclusion may confidently be drawn that neither by iodine injection nor by any means, short of extirpation, will a cure be obtained. In these cases the fluid is often gummy or colloid, sometimes puriform. Once opened, these tumours are liable to run a rapid downward course. Suppuration in the cysts is very likely to occur.

In another class of cases, also numerous, when the fluid ceases to run, the great bulk of the swelling has disappeared. But by deep pressure through the now flaccid abdomen, we come upon a solid residuum in the pelvis, which may sometimes be grasped in the hand, and which may always be defined between the hand outside and a finger in the vagina. In these cases also it is of no use to inject iodine. The solid residuum almost certainly contains smaller cysts, whose development, repressed by the preponderant activity of the one which has been emptied, will quickly take its place, if indeed the first cyst do not fill again. When the tumour has thus grown again, it is generally advisable not to repeat the tapping, but to proceed to extirpation, which holds out the only trustworthy hope.

Exploratory Incision.—Before proceeding to this measure, the call for relief should be so serious as to justify extirpation, should this ultimatum be found practicable. Exploratory incisions are not, it is true, so dangerous as the complete operation; but a fatal issue has with considerable frequency occurred. It properly claims consideration when other means of diagnosis, including puncture or tapping, yield no results, or are contra-indicated. It is advisable on beginning the operation to have all things prepared for proceeding to extirpation. The patient should be in anæsthesia. A small incision, an inch or two long, is made with a bistoury, midway between the umbilicus and pubes. This is very cautiously made, so as to avoid all risk of incising the tumour, which may *not* be ovarian. The incision should be just large enough to admit the finger to feel the tumour, and to sweep round in a short radius, so as to ascertain if there are adhesions. This will generally be large enough also to enable one to inspect the surface of the tumour. The uterus, or uterine fibroid, presents a dark-reddish fleshy appearance, which, if not absolutely differential from the usual pearly-blue aspect of an ovarian cyst, should serve as a warning not to proceed to ulterior measures without further investigation. Or again, if we come upon irregular nodular masses not freely movable upon each other, or *en bloc,* and especially if fixed by broad attachments at the base, there is *primâ facie* evidence of malignancy.

For clinical purposes we divide tumours of the ovary into two classes, namely, *tumours which contain cavities,* and *those which form solid and compact masses.* To the first belong the simple or multiple cysts, the cysto-sarcoma, the colloid tumour, and the cysto-carcinoma; whilst the second comprises the fibroid bodies, the enchondromata, and the cancerous tumours without cavities. This division is certainly useful. But there is another division which, not displacing this one, I think is even more useful in practice. Ovarian tumours may be divided into *benign* and *malignant.* It is not indeed easy in all cases to tell, in the living subject, to which class a particular tumour belongs. But in many cases we can form a reasonably good opinion. For example, we may often negative malignancy. When we can do this the course of treatment to adopt is more easily decided, and the prognosis is more hopeful. On the other hand, we can often affirm malignancy; and in this case we know the treatment must be more circumspect, and the prognosis be more grave.

The evidence deducible from the examination of the fluids drawn by tapping.—Great hopes have been based upon this line of evidence. Chemical and microscopical analysis might be expected to reveal the source whence these fluids come. And undoubtedly the chemical and microscopical features of fluids from ascitic collections, ovarian cysts, cysto-fibromas, renal and hepatic cysts offer characteristic differences. Sometimes, perhaps most frequently, trustworthy evidence may be thus obtained. But in others, and these may be the most critical, where ordinary methods give only doubtful evidence, and where, consequently, we should most anxiously seek for assistance, this method has led to disappointment or error. This happened on one occasion to myself. I submitted some fluid to a gentleman justly considered an authority on this special point. Acting on his report I opened the abdomen expecting to find an ovarian cyst; the actual thing was an encysted peritoneal dropsy. Dr. Fordyce Barker informs me that the "characteristic ovarian cell" was found in the sac of an extra-uterine gestation recently operated upon in New York! Strong testimony is borne by Thomas, Byford, and Atlee to the general accuracy of Drysdale's test when applied by himself. Fig. 91, from Drysdale, shows the microscopical characters of ovarian fluids.

Beginning with the normal Graafian vesicle, we find it to contain a minute quantity of a slightly viscid, whitish-yellow albuminous fluid, resembling the serum of blood. It is alkaline and transparent, limpid, readily separating into minute drops. It contains a small quantity of a substance which will coagulate with alcohol, or when heated. It holds in suspension spheroidal, nucleated epithelial cells, and shreds of epithelium from the membrana granulosa of the ovisac.

Under pathological conditions the fluids of the Graafian follicles are changed. They may be arranged in three groups: 1, fluids resembling the normal fluid of the ovisac; 2, ropy or viscid; 3, resembling mucus. The fluids of the two last groups are frequently met with in multilocular cysts, and in the alveolar and colloid tumours.

The simple cysts commonly contain a clear, limpid, pale-citron or straw-coloured fluid, which flows in a stream as rapidly as blood-serum, or even more so. Scherer demonstrated the presence of *paralbumen* and metalbumen as albuminates peculiar to ovarian fluids. This character is shown by the formation of a coagulum on heating, which is either entirely dissolved or turned into a transparent jelly by adding an equal volume of strong acetic acid and continuing the boiling. When this is found the fluid is probably of ovarian origin.

Fibrinogen is also a constituent of simple cysts. It may be demonstrated by Dr. A. Schmidt's test, which is the addition of a few drops of blood to the fluid, when a distinct clot will form in from twenty-five to ninety minutes, involving the blood-corpuscles which had been added. The clot is generally so firm that it can be raised unbroken, and if squeezed in the hand a quantity of fluid issues, leaving a loose bundle of fibrillated substance. *Cholesterine crystals* are sometimes seen in the fluid of simple cysts, glistening in the stream as it flows through the canula on tapping. After standing awhile these crystals form a pellicle on the surface of the fluid. Scales of *epithelium* are almost always found floating in it.

It must not, however, be assumed that even in simple cysts the fluid is always clear. Pus or blood is occasionally found; and pus is occasionally apt to be found on a second or subsequent tapping, although the fluid drawn by the first tapping was perfectly clear. Admixture of pus and blood will affect the colour variously, according to the period and quantity of the effusion. Thus it may be yellow, green, brownish, or red. The turbidity of the fluid generally depends upon the admixture of these secondary matters. In compound cysts every variety of contents may be found.

The chemical and microscopical characters of ovarian fluids have been elaborately described by Eichwald.* *The first group* of *abnormal fluids, very liquid,* are generally found in molecular cysts with a smooth internal surface invested with a layer of pavement-epithelium. Their specific gravity ranges from 1003 to 1006. They have no odour, and are either neutral or slightly alkaline. The following analysis represents the average composition:—Water, 982·5; mineral salts (sulphates, chlorates, phosphates), 12·0; organic salts (lactates), 4·0; cholesterine, occasionally traces; albuminose, 1·5=1000·0.

These fluids are devoid of fat and albumen.

In the clear slightly ropy fluid of some of the small cysts in the broad ligament, minute flakes are occasionally found. They are granular, with a minute round or irregular cumulus of fatty granules in the centre.

The second group of liquid but ropy ovarian fluids.—They are of the consistence of oil or syrup, and frothing when shaken. They are clear amber or lemon-coloured, or pinkish like the peritoneal fluid. The reddish fluids, after standing, deposit the red blood-corpuscles to which they owe their colour. These fluids may become turbid, and of greyish, yellowish-green or whitish colour from the presence of cells and oil globules, which they hold in suspension. Their reaction is alkaline; specific gravity, 1009 to 1018. Heat, alcohol, and nitric acid will coagulate them like blood or ascitic fluid. Baedeker, Thudichum, and others have found leucine. In the fluid will generally be found epithelial cells, principally the pavement-epithelium, which lines the cavity of the cysts. Besides these, there will be always white blood-corpuscles, sometimes red blood-corpuscles, due to capillary hæmorrhage from the inner surface of the cyst. The fluid in very old cysts becomes thicker, and assumes the consistence and colour of coffee-grounds. It will also contain granules of hæmatosine from disintegrated blood-corpuscles.

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* "Würzburg, Medizinische Zeitschrift," 1864.

Third group. Viscid and ropy fluids.—These are generally clear, colourless, or of a greyish tint, and semi-transparent. They are viscid, adhesive, resembling the vitreous humour of the eye, or jelly-like, breaking up into lumps. They will not pass, or only with difficulty, through a canula. They are alkaline or neutral; specific gravity 1010 to 1015; in colloid cysts 1040 or more. They coagulate when exposed to high temperature, like the white of egg, to which they sometimes bear a great resemblance. The variations depend upon the conditions of the principal components, the colloid bodies and the mucus, and the intermediate stages of metamorphosis from one to the other. Epithelial cells and blood-globules are also found. They contain mineral salts, crystals, or crystallizable principles of organic origin, as fats, and principles allied to alkaloids, viz., urea, creatine, leucine, creatinine.

The microscopical analysis shows fat-granules and globules, large colourless colloid globules, with delicate margins and a large transparent centre, either perfectly homogeneous, or dotted with fine black spots. Some colloid globules enclose one or more granulated aggregations. There may also be found a large quantity of *small circular corpuscles*, clear, with a dark margin, containing a varying number of fine dark molecules, and sometimes, also, several larger granules of high refracting power. They appear to be identical with the *pyoid bodies* of Lebert, or the *exudative cells* of Henle. *Cholesterine crystals* are found in great quantities. *Pigment*, dark-brown, reddish-black, or black, in granules of different sizes, is found.

The following propositions present a fair general guide to diagnosis in so far as indications can be drawn from an examination of the fluid contents of abdominal tumours:—

1. Hair, teeth, oil or fat or a gruel-like fluid, give evidence of a dermoid cyst. Pus may come from an ordinary cystic ovary, but it is more likely to come from a dermoid cyst.

2. Bile-matter, or a more or less deep yellow or green fluid, indicates hepatic origin. In one case an operation that terminated fatally would have been avoided had the fluid been first examined. Echinococci also point to origin in the liver or kidney.

3. Fluids containing urea probably come from a renal cyst.

4. Fluids nearly free from albumen and of low specific gravity point to cysts in the broad ligament.

5. If a clear bright or pale-yellow fluid, which is not viscid, forms a dense white or whitish-yellow coagulum on heating, which is often somewhat yellowed, but not dissolved by boiling in strong acetic acid, it is probably ascitic.

6. If a fluid clear like water, or slightly opalescent, of low specific gravity, forms little or no coagulum on heating, but often becomes markedly turbid if a few drops of acetic acid are first added, and then quite clear again with more acetic acid and more boiling, it is probably from a broad ligament cyst.

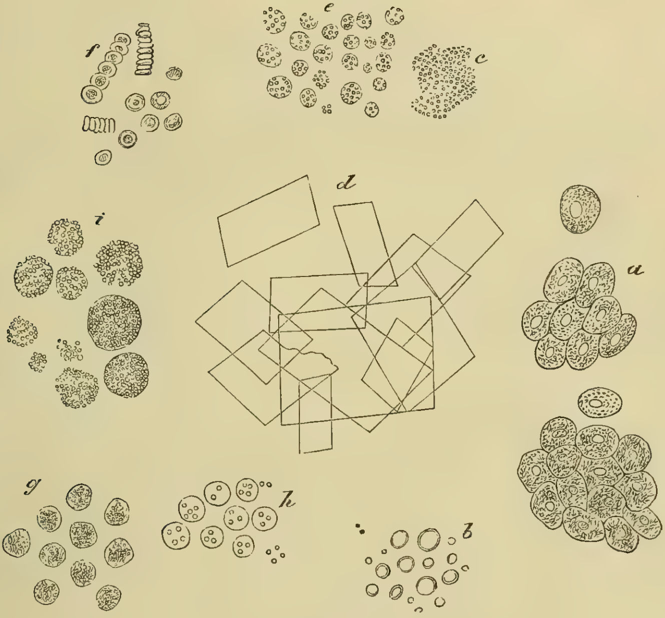

Fig. 91.

MICROSCOPIC CHARACTERS OF OVARIAN FLUIDS—(AFTER THOMAS M. DRYSDALE, PHILADELPHIA, 1873).

a. epithelial cells, *b.* oil globules, *c.* granular matter, *d.* cholesterine, *e.* granular cells, *f.* blood corpuscles, *i.* Gluge's inflammatory globules, *g*, *h*, pus cells and blood.

7. The specific gravity of ovarian fluids varies from 1015 upwards. In extra-ovarian fluids we rarely find any microscopic elements, and the fluid is of low specific gravity—1003 to 1010 at the most. Hydatid cysts, hepatic or renal, also yield fluid of low specific gravity, rarely so high as 1010. Hence a specific gravity below 1010 tells against an ovarian tumour.

8. Fluids of colloid or syrupy consistence, fluids of specific gravity exceeding 1012, containing epithelial cells possessing the character represented (Fig. 77, p. 328, and Fig. 91), point to ovarian tumours.

CHAPTER XVI.

TREATMENT OF OVARIAN CYSTIC DISEASE: HISTORICAL NOTE; MEDICINAL, LOCAL MEDICATION, SURGICAL. TAPPING BY VAGINA; BY ABDOMEN; TAPPING COMBINED WITH IODIC INJECTIONS; INCISIONS IN CYST; ELECTROLYSIS; OVARIOTOMY.

THE scope of this work precludes all attempt at history. The steps by which the present skill in abdominal surgery has been acquired are, however, deeply interesting and instructive. I refer to Peaslee for the most able and impartial historical review. I will do no more in this place than to recall attention to the work and arguments of Dr. Blundell in dispelling the dread of abdominal surgery which so long barred the way to surgical relief of abdominal tumours. Radford, imbued with the teachings of this master, encouraged Clay at the commencement of that career which may be said to have placed ovariotomy upon a secure foundation. Southam, also, of Manchester, in 1843-5, recorded cases (*Medico-Chirurgical Transactions*), and spoke with unreserved confidence of the future of ovariotomy. Walne and Samuel Lane had before this date been operating with fair success, and never wavered in their confidence of the merits of the operation.

The operation was suggested by William Hunter; its practicability and the mode of performing it were taught by John Bell; it was first practised, and that successfully, by an American, McDowell, a pupil of John Bell. The more recent successes of Atlee, Peaslee, Spencer Wells, Keith, Koeberle, and others, ought not to be allowed to obliterate the claims of Walne, Samuel Lane, Bird, and Baker Brown, which, although not unchallenged in some respects, yet deserve the honour that is due to enterprise and priority.

The experience of a century has confirmed the conclusions arrived at by William Hunter, that ovarian dropsy was an incurable disease; and that the only palliative was tapping.

The methods by which nature or accident effects a cure are uncertain, so unforeseen, that the expectation of relief by them cannot influence the conduct of the surgeon. Rupture, perforation, or twisting of the tumour may indeed effect a cure, but they are far more likely to cause death.

It may with confidence be affirmed that if a woman is to be rescued from the danger of an ovarian tumour, the only reasonable prospect lies in extirpation.

The following proceedings may be recorded, chiefly as examples of failure :—

1. *Medicinal.*—The Pharmacopœia has been ransacked in vain. There is no trustworthy evidence that any internal remedy has the slightest influence in arresting the growth of an ovarian cyst. If in a few instances a cyst has seemed to disappear or to diminish under the use of bromides, iodides, chlorates, or other medicines, further trials have resulted in signal failure, suggesting that the cases of presumed cure were but examples of error in diagnosis.

2. *Local Medication.*—Peaslee says, "In several instances the growth of ovarian cysts in the early stage had been apparently arrested by the application, *per vaginam*, of iodide of lead. But," he adds, "further trials must demonstrate how permanent is to be the benefit thus obtained." Firm pressure upon the tumour, at one time much vaunted, has passed into the domain of history.

3. *Surgical Proceedings.*—Although all surgical proceedings, short of extirpation, which have been tried for the relief or cure of ovarian cystic tumours, have yielded for the most part unsatisfactory results, a brief review even of those which have most unequivocally failed is useful. This review may save us from repeating operations which experience has condemned. These proceedings may be regarded as experiments illustrating the constitution and behaviour of cystic tumours. And some of them, although they have lost claim to be regarded as generally applicable, may still prove valuable in exceptional cases.

Tapping and iodic injections have to some extent been discussed under "Diagnosis." Many simple cysts may be cured by simple tapping, or by tapping and injection of iodine. This especially applies to cysts of the broad ligament. Should examination of the fluid drawn by aspiration indicate a cyst of this kind, iodic injection may be resorted to with some confidence. But the case of true ovarian cysts is very different. Sometimes tapping itself proves fatal. It is not always less hazardous than ovariotomy. In the great majority of cases the cyst will quickly fill again; and the operation must be repeated. Sometimes tapping is followed by inflammation and suppuration of the tumour. And although tapping will commonly give immediate comparative relief, it has been thought that the disease is often accelerated by it. Tapping finds an especially valuable application in some cases where the diagnosis of ovarian cystic tumour is not sufficiently clear to justify laparotomy.

Tapping by the Vagina.—The argument for this proceeding rests upon the anatomical fact, that the ovary always occupies the lowest position in the pelvis. It is in direct relation with the roof of the vagina, and below the intestines. A fair amount of success has attended the operation; but there is not sufficient reason to conclude that it is more favourable than tapping by the abdomen.

There are two forms of tapping: the one is *simple tapping;* in the other the tapping is supplemented by other proceedings, as *keeping the cyst open*, and *throwing irritant or other fluids into the cyst.*

Simple tapping consists in puncturing the cyst, draining off the fluid contents, and then letting the opening close. This proceeding may be adopted as a palliative, with a view to cure; or as tentative with a view to obtaining information to guide further treatment. It is useful only in a limited order of cases. Our first care then is selection. The favourable conditions are: a small cyst which descends fairly behind the uterus, bulging out the posterior wall and roof of the vagina; distinct fluctuation; absence of solid masses at the most prominent point where puncture must be made.

The cases in which vaginal tapping is most likely to be useful are the monocystic. But this condition can hardly be determined before tapping; and thus tapping comes to be experimental as regards treatment, and exploratory as aiding diagnosis. I would therefore strongly advise that the first or diagnostic tapping be made by the aspirator-trocar. Comparatively little risk attends this method, but it is not absolutely free from danger.

The Operation.—The first point is to select the place for puncture. This should be determined with precision. The cyst, it is assumed, occupies by its most dependent part the peritoneal sac between the uterus and rectum. Occupying this space, it causes the uterus and rectum to diverge, the uterus is pushed forwards and a little to one side, the rectum is compressed or flattened backwards. The perforating instrument must therefore strike between these two organs. First, pass a catheter into the bladder, to empty this organ, to ensure its safety, to remove it from all interference. Secondly, feel for the position of the uterus by touch and by the sound. In front of the os uteri through the anterior vaginal wall, we may feel the body of the uterus; by passing the sound, the position and relations of the uterus are made still more clear. This is one great landmark. We must keep behind this. Thirdly, pass the forefinger into the rectum, the sound being still in the uterus. You will then ascertain the position and relations of the rectum at the level of the tumour and os uteri. There will probably be a space of one or two inches or more between the os uteri and the anterior wall of the rectum. It is within this space that the puncture must be made. The anterior wall of the rectum is the other great landmark. Fourthly, your finger quits the rectum and returns to the roof of the vagina behind the cervix uteri; then, feeling the cyst here, press firmly down towards it the cyst from above by your other hand on the abdominal wall above the pubes. You thus get evidence of a fluctuating point. Tapping being resolved upon, you place the patient in position. It is scarcely desirable to give chloroform. The lithotomy-position is convenient; but it is often quite as easy to operate, the patient lying in bed on her left side, the nates drawn well to the edge. An assistant presses the tumour firmly down into the pelvis; the forefinger resting on the tumour an inch or so behind the cervix uteri guides the trocar, which is thrust in perpendicularly to the surface, and carried in the direction of the axis of the pelvis for about an inch, parallel to the course of the uterus indicated by the sound, or until the sense of resistance is suddenly lost. Then, the fluid ought to flow either spontaneously, or under the vacuum produced by the pump. The exhausting pressure should be kept up as long as fluid flows. Then explore to ascertain what remains of the tumour. Withdraw the trocar. Enough has been done for the occasion. Time must be allowed to observe the subsequent course of events, before the diagnosis can be absolute, and before determining on further operations.

As yet we cannot be certain that the cyst is not formed by a tubal gestation, or by dropsy of the Fallopian tube. In either of these cases it would not be desirable to enlarge the opening or to inject fluid into the cyst. Simple exhaustion of the fluid contents may be sufficient for cure of either of these affections, and also of a simple cyst of the ovary or of the broad ligament. It is obviously, then, sound practice to take the benefit of this possibility of cure.

If the cyst be ovarian it will probably fill again. By repeated tapping by vacuum, a small ovarian cyst may gradually become smaller, shrivel up, and be obliterated. This process may be accelerated by iodine injection, or by drainage. The most convenient drain is a silver coil tube.

Firm pressure by compress and binder should be applied immediately after operation, and sustained for some days. The double use of this is to obviate the vacuum that might otherwise form, favouring suction of air into the cyst; and to promote the reduction of the cyst by maintaining its walls in contact.

Rest in bed for a week, salines and sedatives are to be recommended as after-treatment.

If, aided by this preliminary tapping, the tumour be found to be ovarian, and be of the size of a fœtal head, or somewhat larger, we may then consider the expediency of tapping by the vagina, and keeping the cyst open, so as to allow continuous drainage to go on. The preparatory steps are the same as those already described. It is best to use the long tube, carrying a knife designed by me for similar operations, which can be connected with the aspirator, and will serve to introduce a coil drainage-tube. By this the wound is enlarged, to allow the forefinger to pass into the collapsing sac, to ascertain the condition of the internal surface. On the second or third day, symptoms of inflammation of the cyst, with severe reaction, commonly set in. A discharge of ichorous fluid takes place, and there is great pain in the pelvic region. In favourable cases, says Kiwisch, these symptoms gradually gave way to a purulent discharge, which ceased in from five to seven weeks, and then shrivelling and perfect obliteration of the cyst took place. As long as any secretion goes on it is desirable to inject carbolized water through the tube daily.

Scanzoni* is an advocate for the vaginal tapping, in preference to abdominal tapping, generally, when the cyst can be reached by the vagina, amongst other reasons, because it secures more perfect draining of the cyst. If this could be always performed, he says, abdominal tapping would disappear from the rank of recognized operations. Our experience of this method is, perhaps, insufficient. But it is certain that the advantages of it are not without a drawback of danger and of failure. There is always an element of uncertainty, owing to the varying character of these tumours, complications, and the idiosyncrasy of the patient. The operation is, therefore, of an experimental kind. The inflammation, the suppuration, may extend beyond the wished-for limits. Then there is an objection which especially applies to tapping through the vagina. The wound is necessarily made at the base of the tumour, where solid elements are most commonly found, and where the blood-vessels which feed the tumour are largest and most abundant. Kiwisch himself, the chief advocate for the measure, says it is only of use in moderately-large simple cysts, because in very large cysts the extensive decomposition must be very exhausting to the system, and compound cysts do not allow of a full shrivelling-up of the sac. Now here is the difficulty; we can rarely be certain that the cyst is not compound.

Some cases are related by Mr. Wells. His conclusion is, that "simple tapping is more hazardous than tapping followed by drainage, and that drainage should be so complete, that no re-accumulation of fluid can take place, the cavity being kept open until the walls collapse and unite, so that it is completely obliterated.".

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* "Maladies des Organes Sexuels de la Femme." French ed., 1858.

I am disposed to qualify this view. Assuming that only those cases are suitable for vaginal tapping, in which there is strong presumption that the cyst is single, I would first practise a simple tapping; and if the cyst refilled I would combine the second tapping with drainage.

Tavignot proposed *tapping by the rectum*. Where the tumour protrudes more within reach by this canal, it may be preferable to tapping by the vagina. But whilst open to all the objections urged against tapping by the vagina, it is far less convenient for drainage. And dysenteric tenesmus has been caused by the irritation produced.

THE OPERATION OF TAPPING BY THE ABDOMEN.

Tapping by the abdomen is an operation often of necessity to relieve urgent distress of breathing. It scarcely merits the rank of an operation of election; since, except in rare and unforeseen cases, it is at best a palliative only. But as a palliative it is exceedingly valuable. It is applicable to a large class of cases, and especially to those large tumours which are admittedly unfit for vaginal tapping. It is a legitimate resource in most cases where, for any reason, extirpation of the tumour is excluded. It possesses the great advantages over the vaginal operation, that it is easier of performance, that it is done at a distance from the base of the tumour, so that we are more likely to avoid wounding solid and vascular parts; that there is, further, a considerable area of space within which we can select the point for puncture.

The following dangers attend tapping by the abdomen :—

1. It is possible to wound a vessel in the abdominal wall large enough to cause serious bleeding. This is no real bar, because all serious bleeding may be avoided by selecting the linea alba for puncture, and by dividing the skin by a scalpel, by which precaution we can secure any injured vessel before plunging in the trocar.

2. The risk of wounding some large vessel in the wall of the sac is more serious, and can hardly be secured against. This risk is, however, small in cysts presumed to be single, and in which free fluctuation indicates that the walls are thin. In the case of tumours partly solid, and whose walls, even at the fluctuating parts, are thick, the risk is very great, so great in fact, that if things generally are not adverse, the major operation of extirpation should be at once preferred. The hæmorrhage is dangerous in two ways: blood may be slowly poured out into the peritoneum, setting up peritonitis: or it may pour into the cyst to such an extent as to cause anæmia, as well as

inflammation of the cyst. If, after tapping a thick-walled cyst, symptoms of internal hæmorrhage arise, the operation for extirpation should be immediately undertaken. By this means, and only by this means, can the bleeding be arrested by tying the pedicle, and the effused blood be removed.

3. The rapid emptying of the cyst may be followed by collapse, just as prostration sometimes follows too rapid delivery. This is our reason for compressing the abdomen by bandages as the fluid escapes.

4. Some of the contents of the cyst may run into the peritoneal cavity and set up inflammation, which may prove fatal. This accident may be avoided by using a sharp well-made trocar, by dividing the skin of the abdomen first by a scalpel, oiling the trocar, and piercing the remains of the abdominal wall and the cyst-wall with a decided stab, so as to carry the canula a good inch or more through into the cavity of the cyst, before withdrawing the trocar.

5. Air may be sucked into the sac. When this accident happens, decomposition and suppuration are very likely to ensue. Irritative fever will set in, and the result may be fatal. This risk should be guarded against by using a trocar so constructed as only to permit flow from the cyst outwards, by keeping the delivery end of the drainage tube under water, and by steadily following down the emptying sac by pressure.

6. In the case of compound cysts, especially if malignant, mere tapping, where precaution against letting-in air has been successful, may be still followed by suppuration and fatal septicæmia. Indeed, in most cases, it is observed that after several tappings the nature of the fluid changes, becoming turbid, more viscid, or puriform. Where evidence of suppuration in the cyst is obtained, the feasibility of extirpating the tumour should be considered.

7. By repeated tapping the system is exhausted by the drain caused by the diversion of material to the cyst. This is probably often increased by tapping, which takes off the pressure that restrained exhalation.

Even where no untoward accidents follow tapping, the relief obtained is often very transient. Fluid rapidly collects again, and the operation must be very soon repeated. It has been supposed that tapping accelerates the progress of the disease,—that it is, in fact, the beginning of the end; that, once performed, the necessity for having recourse to it again and again recurs at a constantly accelerated ratio. There appears to me to be a fallacy lurking under this belief. Tapping is rarely performed until the symptoms are so urgent that relief is imperative. This implies that the disease is in high activity, and that things have reached a climax. From this time it is not surprising that the course should be down-hill, whether tapping be performed or not. And it can scarcely be doubted that in most cases, tapping does afford a respite more or less prolonged. It certainly, in some cases, averts apparently imminent death. In some cases, unforeseen, it must be admitted, it is followed by complete cure.

I think the question may be summed up as follows :—

Tapping has its own immediate dangers, but these are limited to a small proportion of cases ; tapping postpones death from the secondary effects, such as pressure of the tumour upon the viscera and blood-vessels, and allows the sufferer to sink under the proper effects of the progressive disease.

Dr. Fock published a memoir in 1856, in which it is stated that out of 132 cases of ovarian disease tapped for the first time, twenty-five died within some hours or a few days. Kiwisch lost nine patients out of sixty-four within twenty-fours after the first tapping. Mr. Southam, of Manchester, collected twenty cases of tapping from various sources ; of these four died within a few hours.

I think, however, these figures give an exaggerated idea of the danger of tapping, if the operation be performed with proper circumspection.

The Operation.—A trocar modified from that of Mr. Charles Thompson, designed for paracentesis thoracis, secures against most of the accidents liable to attend the use of ordinary trocars. The edges of the canula should not be thin, but perfectly smooth and well rounded off. This best obviates the risk of injury to large veins on the inner surface of the cyst ; and the maker should be careful, when sharpening the cutting part of the hollow trocar, to leave one half of the lips quite blunt. If sharpened all round it would act as a punch, and cut out a circular hole in the skin. If the instrument is properly finished, only a semilunar cut is made in the skin and cyst, which closes much more readily than the triangular puncture made by the old trocar. The best position is the semi-recumbent in bed. Empty the bladder by catheter, as it is important to puncture below the umbilicus. A firm linen binder having a long slit in the middle is applied round the belly, so that the slit corresponds with the linea alba ; the two ends are then crossed behind the back and brought out in front, one on each side. A small incision is then made *through the skin only* in the selected spot between umbilicus and symphysis pubis. The trocar is then plunged in. Withdrawing the trocar from the canula exerts a suction-power, and this sets going the syphon-action of the canula and elastic tube. The delivery end of the tube is kept under the surface of the fluid in the receiving-bucket. This is especially desirable towards the end, when the cyst is nearly empty. As the fluid runs and the cyst collapses, the ends of the binder are drawn tighter in to keep up steady compression.

If the canula gets choked, it may be cleared by hooking out the obstructing matter with a stilet. If the flow stops while the tumour is partly collapsed, this may be due to the presence of other cysts which do not communicate with the one tapped. It may then be useful to pass a sound through the canula to feel for these other cysts, which may in turn be punctured, without withdrawing the canula, or there may be a solid residuum which precludes all further benefit from tapping. In withdrawing the instrument it is always well to press the abdominal wall well down upon the cyst, and with the finger and thumb of the other hand so to press the abdominal wall together behind the escaping canula, as to prevent the entrance of air.

Should any bleeding follow, and not be stopped by a little pressure, a harelip pin should be passed completely across the opening, deeply enough beneath the skin to compress any injured vessel. Two or three turns of silk twisted round the pin make sufficient pressure to stop any bleeding.

In ordinary cases a small pad of lint and a slip of adhesive plaster suffice to close the opening. It is often useful to apply pads or compresses of lint or napkins in the flanks to fill up the spaces left flaccid and hollow by the withdrawal of the fluid. The abdomen may then be supported by a binder over all.

One effect following upon tapping is a temporary revival of the secreting power of the kidneys. The quantity of urine thrown off is often considerably increased for a time.

Tapping combined with Injection into the Cyst of Iodic or other Irritating Fluids.

The success attending the injection of wine or iodic solutions into the sac of hydrocele of the testicle naturally led to the imitation of this practice in the treatment of ovarian cysts. But the analogy between the cases is only apparent. A simple serous sac which can be perfectly surveyed and commanded is in reality widely different from the imperfectly accessible and probably proliferous ovarian cyst. The difference in size alone alters the conditions materially. Still the method of injecting has been taken up with enthusiasm, especially by Boinet, who in a valuable work* details several cases in which it was successfully employed. He urged that, when the cyst was unilocular, filled with a limpid, lemon liquid flowing easily, and the patient otherwise of good constitution, it should be tapped and an iodic injection made immediately afterwards. When the contents were drawn off he passed an elastic catheter, of size just fitting the canula, through the canula, which was then withdrawn, leaving the catheter in its place. Through this the injection was made. He used equal parts of tincture of iodine and water, adding a little iodide of potassium. Of this solution he threw in about three ounces. The cyst was then kneaded, and the position of the patient changed so as to ensure free contact everywhere of the solution; it was then, after five or six minutes, withdrawn, if necessary, by aid of the syringe. The catheter was then removed, and the abdomen well compressed and supported by a bandage. If fluid collected again in the cyst. he would repeat the injection several times, anticipating refilling and distension.

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* "Iodothérapie." Paris, 1855.

In multilocular cysts containing a thick liquid, flowing with difficulty, further care is necessary. A large trocar was employed, and after letting all the fluid that could, run, a catheter was passed, and a syringe applied to draw out all the thick viscid matter remaining. The rest of the proceeding was the same as in the simple cysts. But in complicated cysts it was sometimes necessary to keep the catheter in. This was to be done when the cyst showed no tendency to obliteration. In these cases the catheter was plugged, fixed by a bandage, and unstopped two or three times a day to let off the gathering fluid. Washing out the cyst with tepid water or weak solution of iodine was practised occasionally to prevent decomposition, and to clean out the cyst. When the fistulous opening formed by the catheter was well established, so that all escape into the peritoneal cavity was prevented by adhesions, the catheter was replaced by an ivory canula furnished with a stopcock. Then iodic injections and washings were performed from time to time. The result was slow, the cysts taking months to contract and shrivel up.

I practised iodic injections a good many times. In three, perhaps four, cases, the cure was complete and permanent. These were apparently monocystic tumours. Possibly they might have been simple cysts of the broad ligament; and possibly, also, simple puncture without iodic injection might have cured them. In other cases, undoubtedly polycystic, I could not satisfy myself that good was effected. Suppurative inflammation of the cysts set in, and a fatal result, not visibly accelerated by the treatment, followed. In other cases the sac refilled, the patients left the hospital, or were submitted to ovariotomy. Acute pain and a degree of collapse not seldom set in during or soon after the injection.

In all the cases it was easy to detect iodine in the urine; in one case a strong iodic odour was given off from the patient. I detected iodine in the perspiration and in the breath. In another case, as well as in the foregoing, the signs of iodism were marked. But I have not seen a case in which it could be said that the patient was fatally poisoned by the iodine.

Scanzoni and others think iodic injection ought to be rejected altogether. I think it should be rejected if the fluid drawn by tapping be colloid or puriform, if the tumour be of irregular form, or give other evidence of being polycystic.

Since simple tapping may prove fatal, it can hardly be expected that tapping, plus iodic injection, should be free from danger. Dr. R. Löwenhardt* relates a case in which ℥iv. of a mixture of equal parts of tincture of iodine and water, with gr. x. of iodide of potassium, was injected. Death followed in fourteen hours. The cyst was found collapsed; there was no trace of inflammation; in the cyst was a small quantity of clear-brown weakly iodized fluid. Death was ascribed to shock.

Legrand† relates the case of a woman aged fifty-six, in whom a puncture, followed by iodine injection, was made. Little reaction ensued; in eight days the patient was up; the dropsy quickly returned. The operation was repeated, and twelve to fourteen pints of fluid were let out. At the instant of injection the patient sank into syncope; a strong shivering, vomiting, peritonitis set in, and death followed in sixteen hours. In this case, probably, some of the injection escaped into the peritoneum.

It is better, I think, to use the concentrated tincture of iodine. There must always remain fluid enough in the cyst to dilute it, and if used already much diluted, its caustic action on the cyst-wall is lost, whilst absorption into the system is promoted.

In performing the operation, the patient should be on her side in bed. Tapping must be performed in the usual way; and when the cyst is nearly emptied, a flexible catheter, closely fitting the canula, should be passed quite through it, so that the end shall project two or three inches beyond the canula into the cyst. Then the remaining fluid should be allowed to drain from the cyst. When no more can be obtained, four ounces of tincture of iodine should be injected through the canula, and allowed to remain about ten minutes. It may then be drained off as far as possible. I would then advise that an ounce or two of water be injected through the catheter to clear it of iodine before removal. The catheter and canula may then be withdrawn together, taking care to keep the thumb over the end of the catheter, to prevent the escape of iodic fluid into the peritoneum during the passage of the instrument through the wound. It would be unwise to reject Boinet's method altogether. It may fairly claim to be adopted in certain cases of presumably simple cysts where circumstances exclude ovariotomy, such as refusal of patients to submit to this operation, or the complication of severe disease, as phthisis.

Tapping and keeping open the Cyst.—By this plan it was hoped that the fluid, being allowed to escape as quickly as it formed, the cyst would go on contracting gradually to complete obliteration. It was also expected that the irritation set up in the cyst-walls would promote the attainment of this result. A favourable case is reported by Ollenroth (1843). Mr. Alexander Anderson treated two cases in this way, leaving a canula in the cyst. One woman recovered completely after long suffering, suppuration having gone on through the canula, attended with hectic and great emaciation. I saw this case several times, and could not help forming the opinion that her power of resistance against exhausting influences was exceptional. The other woman died a few weeks after the tapping, from constant vomiting. Mr. Anderson abandoned the practice. It is not likely to be revived, unless in very exceptional cases.

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* "Monatsschr. f. Geburtsk," 1860.

† "Gazette des Hôpitaux," 1861.

Cases have, however, occurred in which, after simple tapping, the punctured wound has kept open spontaneously, giving vent, from time to time, to cystic fluid. In this way a slow cure has been effected.

Incision of the Cyst.—Ledran advised and practised the following operation.* When the liquid is thick, and contained in several cysts, he made an incision in the most dependent part of the tumour, and, according to its position, either in the median line, or outside the recti muscles; he then divided the cyst in the same direction, and broke down the internal septa, which could be reached. He placed in the wound a strip of soft rag, for which, at a later period, he substituted a tent, and at last a canula, to preserve free vent for discharges and for detersive injections. By this proceeding the cysts empty themselves, their walls suppurate, cleanse, and contract. Sometimes a fistula, difficult to close, remained. It was found that owing to the retraction of the cyst, the opening in it getting below the level of that in the abdominal wall, fluid would escape into the peritoneum. To obviate this accident, Récamier and others sought to effect adhesion between cyst and abdominal wall by caustics before incision; Trousseau by repeated insertion of long needles; Bégin by cutting through the abdominal wall, so as to bare the cyst, and waiting until adhesion had formed all round the wound before tapping and incision of the cyst.

The results of the operation have not established for it a claim to a recognized place in the rank of elective proceedings. It is now chiefly known as a *pis aller*, as the best thing to do in certain cases where the attempt to perform ovariotomy breaks down, either from insurmountable adhesion or other complications. In this way some most unexpected recoveries have taken place. It scarcely differs in principle from the preceding operation, of keeping open a fistulous canal after tapping. The dangers attending it are greater, and therefore it falls, *à fortiori*, under the like condemnation.

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* See Malgaigne, "Médecine Opératoire," 4ème éd., 1843.

A modification of this proceeding was proposed by Deneux and Sacchi. It consists in cutting away portions of the wall of the cyst. Malgaigne advises it as a resource when extirpation cannot be carried out.

In a case operated upon by Dr. Chambers, at the Chelsea Hospital for Women, Dr. Aveling and myself assisting, adhesions rendered it unwise to proceed with the intended extirpation. The cyst was compound; all the contents that could be easily removed were taken away; and the cyst-wall being included in the sutures through the abdominal wall, the wound was closed, all but a small part at the lower end. Several weeks later the wound only gave vent to a slight oozing of pus; and the patient was in a fair way to recovery.

The excision of a part of the exposed cyst, and then closing the abdominal wound.

Encouraged by the fact that cures have followed the accidental bursting of an ovarian cyst, and discharge of its contents into the peritoneal cavity, whence they have been removed by absorption, Dr. Blundell and others have been led to hope that ovarian dropsy might be successfully treated by deliberate imitation of this accidental process. Guérin, Bainbridge, and others attempted to carry out this idea by making a subcutaneous incision in the wall of the sac by means of a small tenotomy-knife. But this mode of proceeding is open to the grave objection that it is working in the dark. Many tumours have large vessels ramifying on the surface, which, if divided, might give rise to fatal hæmorrhage. Mr. Bainbridge operated by cutting down on the tumour, and excising a piece of the cyst-wall. But this plan, like Guérin's, is open to the objection that the fluid which is to be thrown into the peritoneal cavity may be of a viscid and irritating character. It is true that by his plan Bainbridge avoids the risk of wounding vessels; and as it gives the opportunity of seeing the nature of the tumour and its contents, the operation need not be proceeded with. It might be treated thus far as an exploratory operation, the information gained from which would govern ulterior measures. Baker Brown operated after Bainbridge's method.

The late Professor Simpson thought the proceeding might be usefully modified by making a preliminary tapping, with the view of ascertaining the nature of the fluid; and if this were found to be benign, to allow it to escape into the peritoneum. In this way, he said, having made sure that the fluid was innocuous, he stopped the tapping by shutting up the cutaneous orifice, and allowed the last part of the fluid to run into the cavity of the abdomen. To provide for the escape of subsequent secretion into the abdomen, it is necessary to keep the lips of the puncture in the cyst from closing by first intention. This is the great difficulty. To gain this object, he sometimes made use of a large "quadrangular" trocar. He then forcibly compressed the tumour daily, so as to break down the adhesions which tended to close the cyst. In this way, at least one cure was effected.

These proceedings have not been justified by experience. Repeated simple tapping would seem preferable. It is better to get rid of the fluid directly, than to let it flow into the peritoneal cavity.

Electrolysis.—Does any resource still present itself before the *ultima ratio,* ovariotomy? Some hope has been raised by the method of electrolysis. Like iodic injections, electrolysis was first tried upon hydrocele of the tunica vaginalis. When a student in Paris I saw some cases treated not without success by Leroy d'Etiolles by electrolysis; and I have an indistinct recollection of his applying the same method to other tumours, including ovarian. Fieber reports (*Wien. Med. Presse,* 1871) an apparent cure. The case is further attested by Braun. Other promising illustrations are cited in America and Canada. A memoir on the subject, which I have not had the opportunity of seeing, was read at the session of 1877 of the American Gynæcological Society. In 1876, when on a visit to Montreal, Dr. Macdonald showed me a patient who, in his opinion, confirmed by another surgeon who had aided in the treatment, had been cured by electrolysis. I was not able to detect any remains of disease.

Of uncertain efficacy in hydrocele, electrolysis does not promise much for the more difficult cases of ovarian cystic disease. Treatment must in any case be tedious. In the colloid or proliferous cysts, which make up the greater number of ovarian tumours, it is hard to understand that any benefit can be obtained. And the simple cysts can be dealt with by quicker and surer methods. Still reports of instances in which electrolysis has been tried on cysts precisely diagnosed are interesting.

OVARIOTOMY OR EXTIRPATION OF THE DISEASED OVARY.

Ovariotomy has been contrasted with tapping. The fallacy that deprives this comparison of all practical application is of the same kind as that which invalidates all absolute doctrines in medicine. There are cases for which ovariotomy is best; there are cases for which tapping is best. The great distinction between the two operations is, that the first kills or cures; whilst the second hardly ever cures, and can, at best, prolong life. Looking to cure, we should prefer ovariotomy, if the case admitted of this operation; looking to mere palliation, we must in many cases resort to tapping. The first is more an operation of choice, the second rather one of necessity.

It has been urged against tapping that it lessens the chance of ovariotomy being successful by promoting the formation of adhesions. This objection has been disposed of by experience. The moderate parietal adhesions following tapping rarely present any serious obstacle to the execution of ovariotomy. On the other hand, tapping is often useful in clearing up the diagnosis; as a means of gaining time for the patient's general health to recover; or of lessening the shock by removing the fluid a few hours or days before removing the solid portion of an ovarian cyst. Thus, it may be affirmed that tapping promotes the success of ovariotomy, instead of being antagonistic to it.

PRECAUTIONS BEFORE OPERATING.

1. It is needless to say that a *good diagnosis* is the first point.

2. If there is much *anasarca or œdema* of the legs, it is well to tap some days previously. Great prostration, with quickly supervening dyspnœa, carry the same indication. The effused fluid becomes absorbed and excreted, thus removing what might be an injurious complication. If this be not done, the absorption-process must go on simultaneously with the wished-for process of healing from the operation. In this case the quality of the blood is impaired by having thrown into it, just at the wrong time, a large quantity of watery and effete material.

3. Examine the *urine for albumen*. The presence of albumen is not indeed an absolute contra-indication, for it may depend upon temporary congestion of the kidneys, the immediate consequence of pressure by the tumour. The tumour removed, the kidneys may recover. But if the albumen be accompanied by casts, by persistent œdema of the legs, hands, and face, heart-disease complicating, and be thus traced to permanent Bright's disease, the operation will be likely to fail. Brodie used to insist upon this condition as being highly adverse to the success of capital operations.

Mr. Wells insists further that a small quantity of highly concentrated urine, depositing mixed urates in abundance, indicates a state of hepatic and renal disorder which should be corrected before operating. For this purpose saline purgatives, as sulphate of soda, carbonate of magnesia, and lithia-water may be given with advantage.

4. *Avoid,* unless the urgency is extreme, *a menstrual epoch.* When we can select, the best time is within a week after a period.

5. *The state of the heart and lungs* should also be examined as to their soundness and fitness for work. If there is advanced phthisis it may be of doubtful advantage to operate.

6. *The season.*—When there is a choice it is wise to follow Brodie's advice as to avoiding operation during an east wind. The wind is of more importance than the mere season of the year, the only point usually noted in statistical tables. An east

wind in June may bring more hazard to a severe operation than a west wind in March.

7. If there be evidence of *malignant disease* in the abdomen or elsewhere it will rarely be advisable to operate.

8. Ovariotomy should not be practised whilst the tumour is small, nor until the constitution has undergone some degree of impairment from pressure, and the other effects of the disease. It was at one time very naturally thought that a patient would have a better chance if the operation were performed whilst she was in robust health, and the tumour was small. But experience has not borne out this *a priori* reasoning. Wells prefers waiting. Keith says, "I prefer operating when the tumour is large, and when the patient has suffered a good deal." A better reason perhaps is that in long-standing cases the peritoneum has under constant friction by the tumour undergone such changes that it has lost much of its susceptibility to injurious re-actions under exposure, and the other interferences incidental to the operation. Where adhesions are extensive, it may even be said that we are no longer dealing with a peritoneum in the strict sense.

9. If by tapping or other means we get distinct evidence that the tumour is *colloid*, the danger of waiting outweighs the advantages. Such cysts may grow rapidly, and are very apt to undergo perforation, bursting, inflammation, and suppuration. Unfavourable changes are very apt to follow tapping in these cases. Hence, whenever tapping shows colloid matter, or very little fluid of any kind, especially if the tumour presents irregular projections, it is well to be prepared to operate within a few days.

10. The *place* chosen for the operation is a matter of importance. It should be fairly spacious, light, well-ventilated, and the furniture should be limited to what is necessary. Carpets covering the entire floor are objectionable. A strip on either side of the bed, and a piece or two in places much used, to prevent noise, and which can be taken out of the house to clean, are all that is desirable.

11. The *nurse* should be specially qualified by training; be able to pass the catheter; keep utensils perfectly clean by disinfectants; and able to exercise efficient yet gentle control over the room. She should have nothing else to do. This is a matter of course in a private house; but it is still more imperative in a hospital. A nurse attending an ovariotomy patient should not come into contact with any other patient; above all, she should not be exposed to the risk of contact with infectious or surgical patients.

12. This touches closely upon the great question whether ovariotomy should be performed by surgeons in ordinary hospitals. It may be urged, as a general fact, that all serious

surgical operations are exposed to an increased element of danger in large hospitals; but that this is not held to be an adequate reason for not performing them there. The circumstances of the patient may leave her little choice; whilst the practised skill of the hospital surgeons, and the excellence of the general arrangements of the hospital, may be thought to outweigh the attendant disadvantages. This much being admitted, it will be asked, Is there any special condition attached to ovariotomy, which makes this operation an exception to the general rule, which turns the scale the other way? I think there is. Ovariotomy in some respects has analogies with parturition. The sudden removal of an enormous growth feeding upon the system leads to a constitutional revulsion, and suddenly altered dynamic and constituent conditions of the circulation, which, as in a woman after labour, render her peculiarly susceptible to external impressions, and, especially, to the deleterious action of morbific poisons. To this risk is added the exposure of the peritoneum, a structure remarkably obnoxious to toxical influences, and easily absorbing any contaminating matter which the operating surgeon or his assistants, who are constantly working, as Sidney Smith would say, in the midst of "pus and miasm," are so likely to contract. This danger may be materially lessened by careful adaptation of the antiseptic methods which have been so successfully applied by Lister in other departments of surgery.

With all possible precautions, however, I do not believe that ovariotomy in large general hospitals will ever give results that shall compare favourably with ovariotomy done in private houses or small special hospitals. In this country, at least, where the rights of the humbler classes are respected to a degree unknown elsewhere, it is practically admitted that to deliver women in lying-in hospitals or in general hospitals, is a proceeding justifiable only under peculiarly exceptional conditions. Recognizing this unreservedly, I have felt it my duty steadily to resist the extension of lying-in hospitals, notwithstanding the great temptations these institutions offer for scientific observation and teaching. The passion for study must be kept in subordination to the claims of humanity.

Instruments required.—The necessary instruments for a simple case are few. A scalpel and strong scissors, to divide the abdominal wall; a director, to protect the cyst as this division is completed; a trocar, to empty the cyst; a clamp, to secure the pedicle; needles and silk, to close the wound; with forceps and ligatures, to secure any bleeding vessels, complete the list. But there is no operation where the surgeon may be so met by difficulties where he least expected them. It is wise to take to every case a full armamentarium to meet every possible emergency. Clamps of different sizes, cautery clamps, and cauteries for cases where the clamp is not applicable; whip-cord and silk ligatures;

needles of different shapes and sizes, for cases where neither clamp nor cautery effectually deals with the pedicle; large hare-lip pins, or acupressure needles, for cases where simple ligature cannot be trusted; clamps with screw fastenings, for temporarily securing separated omentum or torn vascular adhesions; artery forceps of different lengths, torsion forceps, bull-dog forceps, vulsella specially adapted for holding large cysts; a chain and wire écraseur; glass drainage-tubes; and perchloride of iron should always accompany the operator. The thermo-cautery is convenient. A lamp and a small hand-mirror should also be provided.

Preliminary Preparations.—A saline purgative should be given the day before; and the bowel washed out by an enema on the morning of the operation. If the operation be fixed for the morning, and this is to be preferred, the patient will take only a light breakfast, at least an hour before.

A strong narrow table is placed conveniently for light and access. It is covered with a firm squab, over which is laid a blanket, and then over all a waterproof sheet. Two or three pails are ready to receive the fluid and the tumour. A small table is placed within reach of the operator's right hand, so that he can help himself to the instruments laid out on it. Iron or copper cauterizing implements are kept in the fire. An assistant is charged with the thermo-cautery, and a strong solution of perchloride of iron. On the fire also is a kettle of water boiling. A nurse has charge of basins, cold water, several sponges, and pieces of thin flannel steeping in hot water, ready to wring out when wanted. All the water used should contain about one per cent. of carbolic acid. A special assistant is ready with the carbolic spray.

The room is kept well ventilated by a fire; but it is not found necessary to keep up a heat of 90° Fahrenheit, as it was at one time thought to be.

The patient is clothed in flannel drawers, stockings, and night-gown, it being important to prevent long exposure of a large surface of the body to cold. She is rendered insensible by chloroform, bichloride of methylene, or ether in her bed, and then removed to the operating-table. The legs are strapped to the table by a belt like a horse-girth. The hands should also be secured by straps. This avoids the necessity of supernumerary assistants. It may be laid down as an axiom, that every additional assistant brought into contact with the patient is an additional element of danger. A waterproof sheet, having a slit in the middle large enough to permit of the operation being done within it, is laid over the patient. This obviates all overflow and mess on the patient and the floor by conducting the fluid contents of the cyst into large pans or buckets placed under the table. An assistant stands at the operator's left hand; another opposite on the other side of the patient. The assistant in charge of the anæsthetic apparatus stands at the patient's head. The catheter is first passed, to ensure an empty bladder. The assistant in charge of the antiseptic apparatus plays the spray so as to envelop the hands of the operator and assistants and the abdomen of the patient in an antiseptic mist.

In making the incision, the following structures are successively divided :—1. The skin ; 2, the subcutaneous areolar tissue, with fat of varying thickness ; 3, the interlaced fibres of the aponeuroses of the abdominal muscles constituting the linea alba ; 4, layers of the fascia transversalis, with more or less fat (the uppermost layer adheres closely to the linea alba : the deepest layer is only very loosely connected with the peritoneum) ; 5, the peritoneum.

The peritoneum may be raised with a hook or forceps. The membrane is then divided by horizontal touches with the knife, and an opening made large enough to admit the insertion of a broad director. Upon this the peritoneum should be slit up.

It is desirable to keep the incision as short as possible. If the tumour will not come through the short incision first made, it can afterwards be lengthened. Any bleeding vessels in the abdominal wound may be secured *pro tempore* by hæmostatic forceps ; and afterwards twisted, or tied with carbolized silk, if necessary.

The incision is made with a scalpel in the linea alba from below the umbilicus towards the pubes, three or four inches long at first, proceeding very carefully as the peritoneum is approached, lest the cyst be penetrated, and its contents escape into the peritoneum before the wound is completed. The peritoneum may be protruded through the wound by some ascitic fluid behind it, and impose upon the operator for the cyst. The touch will commonly correct this by feeling the more solid cyst behind it. The peritoneum is then opened. The cyst comes into view. If ovarian, especially if simple, it is recognized by a glistening, pearly, smooth aspect. If it be a compound cyst its surface may be uneven, it may be redder, vascular, and even hard. If it be a fibroid or fibro-cystic tumour of the uterus the appearance is dark-red, fleshy, and firm. The incision is made just large enough at first to admit the hand, which should be passed in *clean*, and very gently, lest it rupture the cyst, and carried round between the abdominal wall and the cyst, to feel for adhesions, and if there be any to separate them. This is best done all over the front of the tumour, whilst the cyst is full and tense. The cyst is then punctured by a smart stab with a large trocar, to which a flexible tube is attached, to carry the fluid into a receptacle on the floor. The trocars of Mr. Clay and Dr. Lloyd Roberts are the best I am acquainted with. They hold the cyst-wall after puncture well, and without much risk of tearing away. As the cyst is collapsing its walls are seized in one or two places by forceps, so made as to hold a good fold of the cyst-wall without tearing it. Mr. Sydney Jones has contrived a good forceps for this purpose, and which is also useful as a temporary clamp for adhesions. Whilst an assistant supports the sides of the wound with flannels wrung out of warm water, with the double object of preventing the protrusion of intestines and the escape of fluid into the peritoneal cavity, the cyst is drained as far as it will flow freely. At the same time gentle traction is made on the cyst, to see if it will turn out of the abdomen. If this does not occur readily, the evacuation goes on, and the hand is passed in to explore all round the tumour, breaking down adhesions, if necessary, and ascertaining the existence and extent of solid portions, which may by their bulk oppose the removal of the tumour. If, during this proceeding, the cyst-wall be kept well drawn out, and over one side of the patient, the opening made by the trocar will be clear of the abdominal wound, and no fluid will escape into it. If there are no adhesions, or only such as are readily broken down, and if there is little or no solid element in the tumour, it will easily turn out. As this is done, the assistants, with warm moist flannels, carefully press up the abdominal wall behind the tumour, so as to keep the cavity closed. Care is taken, especially at the last stage, to prevent the tumour falling suddenly, lest it drag injuriously upon the pedicle. When it is fairly out, and well supported, the operator examines the pedicle.

The pedicle.—If the pedicle is of sufficient length to permit of the stump being secured outside the abdominal wound without dragging upon the uterus, this method should be preferred. This, the so-called *extra-peritoneal method* of dealing with the pedicle, stands in contrast with the intra-peritoneal method of tying or cauterizing the pedicle, and leaving it in the abdominal cavity, closing the wound over all. Mr. Hutchinson's introduction of the clamp to facilitate the extra-peritoneal plan has been very generally admitted to be one of the most substantial improvements acquired for ovariotomy. The choice of a clamp is important. A good clamp unites the following points: it is sufficiently long and slightly curved on the flat, so as to embrace the pedicle well and allow the ends to rise up away from the wound and the abdominal wall; the ends are smooth and rounded, so as not to dig into the skin; the two blades are roughened on the inner sides, and made by a screw at each end to carry the blades together in perfect parallelism, thus safely strangling the vessels and crimping the stump; the screws are accessible and work easily, so as to permit of easy removal of the clamp when it has done its duty. The clamps which, to my knowledge, most completely answer to this description, are those of Drs. Chambers and Lloyd Roberts. Securing the stump outside the wound possesses the following advantage:—The surface, which may bleed or yield noxious discharges, is always kept in sight, and all discharge escapes externally. It has been urged that the seclusion of the stump within the abdominal cavity places it in a like position to a subcutaneous wound, and that it is consequently less likely to undergo decomposition than if exposed to the air. The stump, it is affirmed, will be surrounded with benignant plastic effusions, and thus occasion no trouble. These propositions are to a great extent true. But experience proves that the method does not guard against danger so surely as that of keeping the stump outside. The ligature which is necessary to secure the pedicle must be very strong; it must be drawn very tightly to close the vessels in it; sometimes two or three stout ligatures are necessary. These themselves may be a source of irritation. Then, after a while, the tissues embraced in the ligatures shrink a little, the ligatures become looser, and under returning reaction bleeding takes place into the abdomen. Mr. Spencer Wells has also observed that on the return of menstruation, blood is poured out from the surface of the stump. Dr. Lloyd Roberts, who has carefully studied the relative merits of the two methods, is of opinion that menstruation is less likely to take place under the intra-peritoneal method; that under the clamp method the Fallopian tube is apt to maintain its patency, thus giving issue to menstrual secretion, and keeping up a troublesome sore. He, however, as a general rule prefers the clamp, and suggests that it is better suited to non-menstruating women. My own observation would lead me to conclude that tying or cautery is more especially applicable to women past the climacteric.

Other disadvantages of the clamp are: the length of time required for its separation and for the healing of the wound, owing to the ulceration produced by the pressure of the clamp. This last trouble may be lessened by the choice of a good clamp. Another danger attending the clamp is that the stump strangulated in it, may slough and fall back into the abdomen.

But the successful use of the extra-peritoneal method depends upon the pedicle being long enough to afford a good hold for the clamp, and for this to rest upon the abdominal wall *without serious strain or dragging* upon the broad ligament and uterus. This dragging is the source of great pain, and may lead to exhaustion or inflammation. If it is found to occur after the clamp has been applied, it may be wise to tie the stump below the clamp and let it drop into the cavity, either cutting the ligature close, or keeping the ends hanging out of the wound.

Ligature.—If the pedicle is too short for a clamp, it is seized by a long screw-forceps fenestrated; and below the fenestræ a strong whip-cord is carried double on a needle through the pedicle, and then tied in two parts. One end may be brought out of the wound, or both ends cut short and dropped in.

Cautery.—Where the pedicle is too short even for the ligature to give a secure hold, it should be grasped by a cautery-clamp, and the tumour severed from it by the actual cautery. Care should be taken to use a dull heat only, so as to char down very slowly. This method will probably come into more extensive use, as one of election and not alone of necessity. Keith tells me (November, 1877) that out of fifty-nine cases so treated by him only four died. The cases best fitted for cautery are those in which the pedicle is thick and fleshy.

Another method of securing the pedicle is the "*pocketing*," so-called by Dr. H. Storer. The pedicle, held in a clamp, is divided by scissors, bleeding vessels are secured by wire ligatures, and then having united the primary incision by means of iron-wire sutures, he brings the extremity of the pedicle between the inner lips of the wound at its lower angle, and there "*pockets it.*"

One cause of mortality after ovariotomy is hæmorrhage. It is the most preventable. No pains, no time can be misspent in securing against this accident. The bleeding may come from three sources: 1, the large vessels of the pedicle. This of course is obviated by care in setting the clamp, or by ligatures or cautery; 2, from vessels severed when separating the cyst from adhesions. These may be secured by carbolized silk ligatures cut short and left *in sitû*, by torsion, or by cautery; 3, from an inflamed or vascular surface oozing "*en nappe*" where no bleeding-vessel can be seen. This is a peculiarly dangerous form, for unless effectually arrested before closing the wound, it may go on afterwards and cause death. I have tried actual cautery, colloid styptic, and swabbing with perchloride of iron, and have no hesitation in saying that the iron is the only thing to be relied upon. The bleeding surface should be swabbed with a strong solution, lightly wiping off any superfluity. The application is, I believe, harmless; I have had uninterrupted recoveries after it; and it is surely less to be apprehended than hæmorrhage.

To insure full visual inspection of the cavity of the pelvis or other hollows, it is well to be provided with a hand looking-glass or a lamp to throw light into dark nooks.

When the pedicle is secured, search for the other ovary, to ascertain if it be not so affected as to require removal. Also trace the omentum to see if all is clear from entanglement with the intestines. If a fibroid tumour project from the uterus, it is better to leave it alone.

Clean out the Abdominal Cavity.—Remove by sponges all ovarian fluid or blood which may have found its way in. This is an object of paramount importance, and especially so if the contents of the cyst be viscid or puriform. But too great pains cannot be taken to prevent fluid getting into the peritoneum. If it be found, from the cyst being rotten or other cause, that the fluid will run over, turn the patient on her side, so as to give a dependent drainage away from the abdominal cavity.

Drainage.—When closing the wound the question of *drainage* must be considered. A large proportion of deaths occurs from septicæmia, connected with the collection in the peritoneum of purulent matter or blood, or serum undergoing change. If this could be drawn off, it is reasonable to infer that the prospect of recovery would be improved. Experience confirms this inference. Keith especially commends the practice. It has been proposed to place in every case a drainage-tube through an opening expressly made in the bottom of Douglas's pouch into the vagina. Experience has not proved that this plan is judicious. In the first place, the simple cases, uncomplicated with hæmorrhage, adhesions or foul matter in the peritoneum, commonly do so well without drainage that it is *primâ facie* unwise to introduce a possible element of danger. In such cases, then, drainage should be dispensed with. In cases where the adverse conditions are present drainage is of eminent service. In many cases a sort of natural drainage has been established by the side of the stump; and sometimes when this has not been considered sufficient, the surgeon has removed one or more sutures, so as to allow freer evacuation and syringing of the foul cavity. And this with good effect. But there is an advantage in making special provision for drainage. The following is the method of drainage adopted by Keith. I am indebted to him for the description. He uses a glass tube open at both ends, one end, and that which goes into the pelvis, being, moreover, perforated for an inch or so by several holes. The tube is selected of a length that may appear suitable. This is usually about six or seven inches. The calibre is chosen large or small just as oozing of blood or only serum is expected. On the neck of the tube is a raised shoulder or rim to hold a piece of thin sheet india-rubber 18 inches square, so as to wrap over a sponge wrung out of carbolic acid solution—1 in 30. This sucks up any fluid that may drain, preserves cleanliness, and enables us to know to a drop how much escapes. The tube is placed tightly between the two lower stitches, the end passing down into Douglas's pouch. Any fluid collecting in the pouch can be drawn off by passing a fine india-rubber tube down the drainage tube and aspirating by a syringe. This should be repeated twice a day, if necessary, and the sponge replaced. The glass tube, it is clear, acts like the shaft of a well, and the syringe converts it into a pump. The tube may also serve as a means of washing out the cavity, by injecting weak carbolic water. The drainage tube may generally be removed at the end of five or six days. But, adds

Keith, "Since I have regularly done my ovariotomies under the carbolic acid spray, I drain almost never. If you leave sweet serum behind and a sweet abdomen, the peritoneum will take care of itself after oozing. Antiseptics will do away with the blood-poison."

J. F. Miner (*Buffalo Med. Surg. Journ.*, 1856) suggested a very well-designed plan of drainage. Having tied the pedicle as a whole, he carried the ends down through an opening made in *Douglas's pouch, thus inverting the part like a funnel* and securing a drain for any purulent matter that might form.

Closing the Abdominal Wound.—Every variety of suture has been employed. The choice has not much effect upon the result of the operation. Most operators use the silver-wire.

It has happened to me to have to use both silk and wire in the same operation. I found the wire sutures were more free from purulent tracts than the silk. They are also more convenient for removal. Wire, therefore, should be preferred. The sutures may be carried either by glovers' needles about two and a half inches long, each end of the suture being armed with a needle, or by a strong, slightly-curved needle mounted on a handle. The advantage of the first plan is that each needle may be introduced from within outwards, so as to attain more exact uniformity in adaptation. Each suture should take in about a quarter of an inch of peritoneum, and then perforating the whole thickness of the abdominal wall obliquely, come out about three-quarters of an inch from the wound. When the two heads of the suture are brought together, the two sides of the wound are thus accurately apposed. Sutures should be applied at intervals of an inch. They should not be secured until all have been introduced. An assistant holds all the heads in order as they are passed from above downwards, so as to avoid entangling. If the clamp has been used, a suture should be applied close to it, so as to bring the lips of the wound close together around the pedicle.

The clamp is then warded off from the skin and wound by a pledget of lint soaked in carbolized oil laid beneath it. The surface of the stump should be sprinkled with dry perchloride of iron, or with tincture of iodine.

The Dressing.—Pledgets of carbolized lint are laid on the wound. Over this is a layer of carbolized gauze. Pads of antiseptic cotton-wool are disposed on each side; broad strips of plaster are passed over all, so as to give firm support; and lastly, a flannel belt secures all. It is a great advantage to use a many-headed flannel bandage; the heads crossing each other in front can be adjusted with great accuracy, securing uniform pressure; and when it is necessary to examine the wound this can be done with the least possible disturbance, by simply throwing back the ends of the bandage.

Certain complications may render it expedient to modify the operation.

1. The *cyst* may be so *friable or rotten* that it breaks down under the most careful handling. Great pains must be taken to bring away the cyst without leaving pieces of it, or the contents in the abdomen.

2. If the *cyst is multilocular,* so that after tapping the main cyst the tumour is still too large to come through without enlarging the abdominal incision, the septa should be broken down by the hand, and any semi-solid contents brought away. It is only when accommodation cannot be got in this way that the incision should be extended.

3. *Extensive firm adhesions* may be found in front. These can generally be broken down by the flat hand working under the abdominal wall. But it may be necessary to enlarge the wound and evert its lips, so as to be able to divide the adhesions by the handle of the scalpel, by its edge, or by the adze-edged cauterizing iron. The latter is perhaps the best plan, as it stops bleeding. The bands of adhesion are first embraced by a clamp, such as of those proposed by John Clay and Chambers; the iron of a dull heat is then applied to the cyst-side of the clamp, which protects the visceral side from injury. If divided by knife it may be necessary to tie small bleeding vessels with silk or wire. When this is done the ends of the sutures should be cut off short. If obstinate adhesions to the intestines are found the same means must be employed to divide them. It has been found occasionally necessary to leave portions of the cyst adhering. If there be adhesions to the omentum these must be carefully detached as far as possible. The omentum itself must then be spread out on a clean napkin, and examined for bleeding points. Wherever these are found a silk ligature is put round them, the piece of omentum is cut off, and the ligature cut short.

Mr. Hutchinson calls attention to *a special difficulty* caused by adhesions in front. Great difficulty may occur in distinguishing the cyst. The operator may mistake the cellular interspace between the transversalis fascia and the parietal peritoneum for that between the cyst and the latter. If not quickly discovered this error may be the cause of great damage. In endeavouring to avoid it the surgeon may commit another; he may incise the visceral peritoneum of the cyst, and proceed to separate it. In many cases the exterior of the cyst deprived of its peritoneum is smooth, white, and glistening, the adhesions are cellular and easily broken through, so that there is nothing to apprise the operator of his mistake. One plan there is in case of perplexity to avoid all risk of these two errors: it is to enlarge the wound upwards until the peritoneal cavity is opened at a part where no adhesions exist. When once the operator's finger has touched the intestine he knows where he is, and may proceed to detach adhesions without any fear of mistake.

In cases where the detachment of the cyst would be dangerous or impossible, Dr. Atlee has solved the problem by a very ingenious plan. He leaves the peritoneum with its adhesions, by separating it from the fibrous wall of the cyst, so that the adherent portion peeled off is left in contact with the viscus to which it was attached. "Dr. W. L. Atlee has practised this," says Peaslee, "for many years past. In his 215th case adhesions seven or eight inches long were thus left attached to the transverse colon." This is a form of *enucleation of the tumour,* a proceeding by which the whole or the greater part of the tumour is peeled out of its peritoneal investment. Dr. Miner claims the credit of designing this ingenious plan. Dr. Walter Burnham, of Lowell, Mass., reports a successful case. Logan (*Amer. Journ. of Med. Sc.,* 1873) reports a successful case. I believe it was first practised in this country, at my suggestion, by Mr. MacCormac, in 1873, at St. Thomas's Hospital. It is a resource that should be borne in mind as a means of avoiding the great violence and extensive injury which detachment from intimate adhesions to the liver and other organs would entail.

Pelvic adhesions may require special management. T. Holmes says: "Any persistent attempt to dissect or tear away the mass from the pelvis may end in laceration of the ureters or great veins, and may after all be futile. The alternatives are to pull the cyst as far as possible out of the abdomen, and apply a clamp to its neck; or to apply a clamp temporarily, cut away the cyst, tear the cut edges with the cautery, and return the mass into the abdomen; or finally to stitch the edges of the cyst to the wound in the abdomen, and leave the cavity of the cyst exposed." The first is preferable when practicable.

Walter F. Atlee, M.D. (*Amer. Journ. of Med. Sc.,* 1877) relates a case, successful, in which he brought out as large a portion of the cyst as possible, clamped, cut it off, and carefully closed the wound behind it, trusting that the ovary would be sealed to the peritoneum of the ovary, and so close the peritoneal cavity.

Wounds of Intestine.—In detaching intimate adhesions the coats of the intestine may give way, or a wound may be made into it by knife or scissors, or the fingers. Wherever intestine is the seat of inflammation or adhesion it becomes extremely lacerable. The opening should be neatly stitched up with a fine needle and silk, cutting the ends of the suture short. This accident does not appear to compromise the success of the operation. I have seen several recoveries after it.

Bleeding from a surface is to be controlled as already directed.

AFTER-TREATMENT.

Rest is the great principle to be observed. To help this an opiate suppository, or an opium pill, should be given two or three times a day, to tranquillize nervous excitement and restrain action of the bowels. If vomiting occur, or indeed to anticipate it, give the patient ice to suck; bismuth or oxalate of cerium may be combined with the opium. The diet should be highly nutritious, not stimulating: beef-tea, milk, eggs, constitute nearly all that can be given with safety. Wine or spirits must be given very sparingly, and rather as means of restoring the system, if it show signs of flagging, than as a recognized part of the diet. The bladder should be emptied by catheter every eight hours.

To relieve vomiting and tympanites I have found O'Byrne's tube passed a foot or more up the rectum very useful. And the injection into the rectum of half a drachm of chloral, with a drachm of bismuth, a little tragacanth, and four ounces of milk, is of marked service in allaying irritability.

Unless local distress arise, the wound need not be disturbed for three days. On the fourth day the stump may be examined. It will commonly be found shrivelling up, sometimes even dry. The clamp may now be removed. If there be any discharge, wash lightly with weak carbolic acid, and dress with lint steeped in carbolic oil.

The abdominal wound is often firmly united in four or five days; but the sutures, if of wire, may usefully remain until the seventh or eighth before being removed. It is desirable to keep a flannel belt or binder on for some days after this.

To obviate hernia and to promote the return of the flaccid abdominal walls to due relation with the lessened bulk of contents, a well-adjusted belt should be worn for a year.

Accidents that may interrupt recovery after ovariotomy.

When bad symptoms follow ovariotomy, as pain, vomiting, fever with abdominal distension, it is probable that some fluid, blood, serum, or pus is collecting in the peritoneal cavity. It may collect in such quantity as to give rise to sensible fluctuation from one side of the abdomen to the other, or it may gravitate to the bottom of Douglas's space, and form a tense swelling behind the uterus.

Whenever fluid can be detected by vaginal examination in the neighbourhood of the uterus, it is usually in such quantity that it must be removed. This may be done by a long rather fine trocar and aspirator. The seat of puncture should be where there is free fluctuation behind the uterus, so as to strike a dependent part of Douglas's pouch. A drainage tube may be inserted. But a better plan is to remove a stitch in the lower part of the wound, and insert a glass tube, which will serve to remove offending matter by aspiration, and to cleanse by injecting.

Untoward symptoms must be encountered according to their indications. A survey of the *causes of death* under ovariotomy will supply the best guidance. The first and most immediate cause is commonly *shock and collapse.* A considerable proportion of all the deaths, I am convinced, occurs from *shock.* Recovery from this is greatly a question of individual power of endurance. We can hardly foretell what this power is in any particular case. Women recover from the severest operations attended by all the complications considered the most formidable; others sink after the easiest and simplest operations. Women comparatively robust succumb, whilst the apparently fragile recover. In many cases the unexpected result is not due, at least appreciably, to difference in skill. It can only be referred to difference in innate power of resistance. This is an unknown quantity, and is the chief cause of the uncertainty which surrounds the operation. No doubt the shock can be lessened by care and skill during operation, and the patient can be to some extent supported through it. Shock bears some relation to the length of the operation. Koeberlé found the mortality increased with the time spent in the operation. The patient should be carefully watched and supported during the stage of depression which follows the operation. A free supply of wholesome, fresh, warm air, without draughts, should be secured. If the surface is cold, warm-water bottles must be applied to the feet and legs; light stimulants, as a little brandy and water, or champagne, or ether, or sal volatile, may be administered.

Hæmorrhage.—Internal hæmorrhage may proceed from two sources—the vessels torn across in separating adhesions, and the stump. The modes of avoiding or diminishing this risk have been described. If hæmorrhage to an extent to produce serious symptoms occur, it is better, desperate as the expedient may seem, to open the wound, search for the source, and stop it by styptics, cautery, or ligatures.

Peritonitis is a frequent cause of death. It may be purely traumatic, the result of the violence necessarily done during the operation. It may be due to the injury inflicted in separating adhesions. But it has often been remarked that those subjects in whom a large extent of peritoneum has been altered in character by previous attacks of inflammation, leaving adhesions to the cyst, are not so prone to peritonitis as are many subjects in whom there were no adhesions, the peritoneum retaining all its natural liability to injurious impressions. A more serious form of peritonitis is one that seems analogous to the puerperal form. Here there is commonly septicæmia, or inflammation is propagated from the seat of the pedicle, in which some unhealthy action is going on. It will, of course, be especially likely to occur in the incomplete operations, where a portion of cyst has been left behind. It is also seriously promoted by the escape of the fluid of the cyst into the abdomen, and its imperfect removal. The fluid has been shown in certain cases to possess a peculiarly noxious, even poisonous property.

The earliest signs of peritonitis are pricking and shooting pain in the abdomen; or according to Hutchinson, a peculiar pallor of the cheeks and an anxious expression of countenance, with frontal headache. The pulse becomes quicker and smaller, the skin hot, the temperature rises to 101°, 102°, 103°, or even 104°, the tongue becomes a little dry, and there is almost always more or less sickness. At a later stage the face may become flushed, the skin painfully hot, whilst at the same time the pulse is rapid and very small. Distension of the abdomen with flatus is a common and distressing symptom; and at a later stage the intestines become involved, and the abdomen is full and tympanitic. The peritonitis may be local or general. If limited to the parts adjacent to the pedicle and to the pelvis, it is protective rather than otherwise, since it tends to exclude irritating matters from the general cavity. In cases, however, in which the peritonitis is encysted, very profuse discharge may take place, and the patient may sink ultimately from exhaustion. If from the first the whole peritoneum be invaded, recovery is rare. The *treatment*. Locally, leeches in the earliest stage are useful. The abdomen should be covered with a hot linseed-meal poultice. The relief thus given is not less marked than it often is in puerperal peritonitis. But ice has been used with apparent advantage. My own opinion agrees with Hutchinson's as to the value of mercury and opium, at least in the initiative stages. But salines are also serviceable, the best being the acetate of ammonia. Where the peritonitis is of a low or erysipelatoid type, twenty-drop doses of solution of perchloride of iron should be tried. Where internal hæmorrhage is feared, or when the temperature rises with abdominal pain, the *ice-cap* is often of signal service.

Septicæmia may occur, although not commonly, without much peritonitis. The symptoms then are very similar to those of septicæmic puerperal fever, and should be treated in a similar manner. It is in these cases especially that drainage and washing out the pelvic cavity are indicated. The septicæmic fever requires careful watching. Having fulfilled the first indication, namely, to provide for the removal of the presumed source of the blood-poisoning, the foul matter in the peritoneal cavity, we have to carry out the second indication, that of reducing the fever. The principle of lowering the temperature of the blood by the external application of cold has been successfully applied. The plan advocated by Mr. Knowsley

Thornton (*Med. Chir. Trans.*, 1877), of adapting an ice-cap to the head made of coiled india-rubber, through which a stream of ice-cold water is carried, deserves further trial. Mr. Thornton applies it whenever the temperature rises to 102° F.

Embolism and Thrombosis.—Some deaths have occurred from these conditions.

Phlegmasia dolens occurs occasionally. When it occurs it will be on the side of the stump. Hence it may be assumed to be determined by the clotting of the blood in the vessels strangulated by the clamp or ligatures. But I believe that the invasion of the blood *in loco* by septic matter is a nearly constant factor in thrombosis. This invasion would also naturally be most likely to occur in the neighbourhood of the stump, so that the two factors, stagnation and empoisonment, would be acting together. It is not a necessarily fatal complication. In one case that seemed desperate at the time of operation, in which it was necessary to secure the pedicle by whipcord, and to drop it into the abdomen, recovery took place after phlegmasia dolens.

Obstinate vomiting or hiccough may attend peritonitis. But sometimes they can only be referred to irritation of the ganglionic system, the irritating cause being pain starting from the structures included in the clamp or ligature, or other injury. The vomiting started by the inhalation of chloroform may persist, or it may be due to *strangulation of intestine* by entanglement by omentum.

In two cases *tetanus* proved fatal. In some cases *obstructed intestine* was the immediate cause of death. In one case Keith (*Brit. Med. Journ.*, 1873) succeeded in saving the patient by puncturing the distended colon with a fine needle. Inhalation of nitrite of amyl should be tried in such cases.

Two or three further questions in connexion with ovariotomy call for discussion :—

1. *How to deal with a case in which the cyst has ruptured, or has given rise to effusion of blood, to peritonitis, or to septicœmia.*

This literally vital question has already been partly answered by anticipation. The argument may be stated as follows :—The case is, that the patient is in the most imminent danger from the shock, irritation, and loss of blood attending the injury. The shock may be regarded as a blow struck at the vital powers. We cannot lessen the shock given by this blow ; but we may, in some cases where there is some rally, do good by removing that which is the cause of protracted shock. This cause consists in the irritation arising from the contents of the cyst, or the blood effused in the peritoneum, which irritation is quickly followed by inflammation. Of course the patient may sink rapidly under the primary shock, and thus defeat all idea of giving relief by operation.

But, in not a few cases, the primary shock does not kill. The patient, however, will hardly pull through the secondary dangers of hæmorrhage, peritonitis, and blood-poisoning, unless these be arrested in their course. There is the opportunity of trying to give relief to obviate these dangers. Here then is a case for the decided application of the great law in medicine: Remove the offending cause. If extirpation of a diseased ovary, which is slowly sapping the vital powers, be recognized as a justifiable operation, *à fortiori* must the operation be conceded as necessary when the diseased ovary is the source of instant danger to life. It would be difficult to answer *à priori* reasoning like this, except by urging that, howsoever plausible in theory, it would be useless in practice. But even this answer, which until recently was still urged, is now deprived of force by the results of experience. When the irritating cause has been removed, the patient has recovered.

The *signs of perforation* are local and general. The local signs are: pain setting in more or less suddenly in the abdomen; if a considerable quantity of the contents of the cyst have escaped, sensible diminution in the size of the tumour, marked by diminished tension of it; alteration in the shape of the tumour, it loses sphericity, and any solid portions come into more distinct prominence; the signs of ascites may be added to those of the cystic tumour; fluids of ovarian origin may escape by bowel or bladder. If this last event concur with diminished bulk and altered shape of the tumour the conclusion is clear. There may, however, be increased activity of the kidneys discharging the fluid thrown into the peritoneum by absorption and secretion. The general signs are not constant. There may or may not be rise in pulse and temperature, and rigors; and occasionally there is no appreciable shock. All that may be noticed is a sense of distress, local and general, a minor degree of depression.

Mr. Wells says,* " In several of my cases the operation has been performed after the cyst has burst, and its contents had escaped into the peritoneum. The peritoneum has been found intensely red, thick, soft, or villous, and occasionally covered by loosely adherent flakes of lymph. Yet the result has been surprisingly satisfactory. Twenty-four times has this complication presented itself out of the last 300 of my operations. Five of the patients have died, so that the ordinary rate of mortality does not seem to have been much augmented. At any rate the bursting of the cyst, or the filling of the peritoneum by oozing from the puncture made by tapping the cyst, is no bar to the operation, but rather a reason for doing it without delay." Nor is this experience singular. My own and that of many others is to the same effect.

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* "Diseases of the Ovaries," 1872.

In addition to the cases in which ovariotomy is resorted to deliberately as the best means of rescuing the patient from a more or less lingering death, it is justified under certain accidental circumstances of extreme urgency. Some of these are rupture or strangulation of a cyst, attended with internal hæmorrhage and shock.

2. The occurrence of *strangulation of the tumour as from twisting of the pedicle; of hæmorrhage into the cyst;* or *suppuration in the cyst.* In all these cases there will arise signs of local injury and constitutional distress, not easily distinguishable from those attending perforation or bursting of the cyst. But the indication to remove the offending body is the same. It is not necessary to determine precisely the mode in which it offends. Dr. Malins relates (*Lancet,* 1877) a case in which rotation of the tumour on its pedicle occurred as a consequence of tapping. He removed the tumour successfully.

3. *How to deal with ovarian cystic tumours complicated with pregnancy.*

Ovariotomy during pregnancy has been performed several times, the operator not suspecting the pregnancy before the operation. What should be done when a pregnant uterus is discovered during some stage of ovariotomy? Wells says, "Let it alone," that is, the uterus. Dr. Atlee performed ovariotomy in the second month of pregnancy. It was followed by such great irritability of stomach, in consequence of the state of pregnancy, that the woman could not be nourished, and she died, thirty days after, of starvation. In a case related by Mr. Burd, of Shrewsbury, in 1847, of ovariotomy performed by him in the third or fourth month of pregnancy, abortion took place two days after operation, and was followed by alarming symptoms, lasting several days. Dr. Marion Sims performed ovariotomy in the third month, not detecting the pregnancy until the ovarian tumour had been removed. The patient recovered well, and was delivered of a fine child at term.

Mr. Wells says, "If inadvertently the uterus be penetrated, if any conclusion can be drawn from the case in which I made this mistake and emptied the uterus, and two other cases in which the same mistake was made by other surgeons, who did not empty the uterus, but closed the puncture in its wall by wire sutures, both patients having died after aborting, while mine recovered, it would appear to be the safer practice to empty the uterus."

Wells relates four cases, in one of which ovariotomy was performed at the fourth month of pregnancy, after rupture of the cyst and peritonitis; in the second, third, and fourth the operation was a matter of election to avoid other dangers. The result was successful. All three subjects gave birth to living children at term.

When pregnancy supervenes on ovarian dropsy, there are three, perhaps four, courses out of which to select.

a. We may *leave things alone,* simply watching, prepared to act, if urgency from rupture of the cyst, axial twisting, or hæmorrhage or excessive pressure arise. In a considerable proportion of cases pregnancy goes on to term, and the labour is completed happily. Is it wise then to stand by and trust to the chance of this issue ? If we determine to anticipate danger, we may

b. Tap the cyst. This will, of course, at once lessen the inconvenience of pressure, and the danger of bursting.

c. Or we may *act upon the uterus.* We may lessen the distension and risk of rupture by drawing off the liquor amnii; that is, by inducing labour, postponing the question of dealing with the tumour, until the case is reduced to its simplest expression, by eliminating the pregnancy. I have discussed this question in my work on *Obstetric Operations,* and have there given the reasons which appear to me to weigh in favour of this course.

d. The opposite view, that of *acting on the ovarian tumour by tapping or extirpation,* is well argued by Mr. Goddard (*Obstr. Trans.,* 1871). No doubt in certain cases, either proceeding may be preferable to the other. But, as a general rule, I believe experience will show that it is better to act first upon the pregnant uterus.

Mr. Wells refers to five patients whom he has tapped during pregnancy, one of them three times, one twice, and three once. In all these women great relief was afforded by the tapping, no ill effect of any kind was observed to follow it, and in all the children were born alive, after labours of moderate duration.

There is a peculiar state of nervous and vascular tension produced by pregnancy which should be taken into account. Pregnancy induces great irritability of the nervous centres, spinal and cerebral. This irritability accounts for the greater risk of abortion, of vomiting, if interference be resorted to. It also is a source of danger if accident or complication arise, as rupture of the cyst, or inflammation. And as this complication may be more serious than the operation, the operation may become justifiable as the lesser danger.

Believing, as I do, that a woman in whom pregnancy is complicated with an ovarian cyst, is in a position of imminent peril; that her life is threatened at any moment by some catastrophe which may strike so suddenly and so violently as to leave no time for action, my opinion is decidedly in favour of eliminating the pregnancy. I have acted on this principle on several occasions with a successful result, not counterbalanced by a single unsuccessful one.

If the cyst actually burst, or give rise to hæmorrhage or peritonitis, there should be no hesitation in attempting removal of the tumour, which is the cause of immediate danger.

Ovariotomy by the Vagina.—In suitable cases where the tumour is small, and presumably free from adhesions, Thomas recommends removal through the roof of the vagina. The occasional extrusion of tumours by bursting through this route under the straining of labour lends support to his expedient. Thomas proposes to open Douglas's pouch by the vagina, to puncture the cyst, then to draw it out, to tie the pedicle and cut off the tumour, returning the stump into the abdomen. Some dermoid cysts might admit of removal in this way; but the frequent complication with adhesions would prove a formidable obstacle.

Normal Ovariotomy.—The subject of ovariotomy cannot well be dismissed without reference to the operation of removing the healthy working ovaries, proposed by Dr. R. Battey, of Georgia, U.S.A. The question, of course, does not apply here. This form of "spaying" will be referred to more particularly when discussing the treatment of fibroid tumours of the uterus.

CHAPTER XVII.

SPECIAL PATHOLOGY OF THE UTERUS; DEVELOPMENTAL FAULTS; UNILATERAL DEVELOPMENT; UTERUS BICORNIS; UTERUS BIPARTITUS, BILOCULARIS; HYPERTROPHY; ATROPHY.

BEFORE entering upon uterine pathology proper, it will be useful to take a rapid review of the congenital or developmental abnormities of the uterus. This review is necessary, because these abnormal conditions are often attended by disorder of function, and give rise to symptoms, the interpretation of which would be extremely puzzling, if not sometimes impossible, unless this association were present to the mind. Some of these conditions have been referred to in the history of Retained Menstruation, and of Ectopic Gestation. The following summary is chiefly drawn from Rokitansky and Kussmaul, and from study of specimens in the London museums. The principal varieties of atresia, congenital and acquired, have been considered in Chapter VII. on "Occult Menstruation;" and in the Chapter XIII. on "Ectopic Gestation," that curious form of uterus resulting from arrested development of one horn, has been sufficiently illustrated.

Complete absence of the uterus is extremely rare. When there is apparent absence of the uterus proper, there will be found in one or both sides, behind the bladder, in the peritoneal fold destined to receive the internal genital organs, one or two small flattened roundish bodies, solid, made out of uterine substance, and with a cavity lined with mucous membrane. These are rudimentary uterine horns, to which the Fallopian tubes have a distinct relation, although sometimes these are absent, and sometimes form a blind worm-like tube closed at the juncture with the rudimentary uterus, or opening into it.

This uterine development in the form of two oval hollow rudiments, from which a Fallopian tube runs outwards to its ovary, is Mayer's *uterus bipartitus.* Inwards, and between the same peritoneal folds, these uterine rudiments are united by a closed cord of uterine substance. At the seat of the uterus is found a mass of connective tissue which, mingled sparingly with the just mentioned cord of uterine fibres, assumes the outline of a uterine body, and is inserted below into the roof of the vagina. In this roof a stellate scar is sometimes seen.

When one of these rudimentary uteri has developed into a uterine body, then there appears the *one-horned uterus, uterus unicornis.* When both are developed, then we have the *two-horned uterus, uterus duplex.*

The *one-horned uterus* always appears as one half of a uterus, that is, as the unpaired half of a two-horned uterus, and is either a right or a left uterus. There is a cylindrical or spindle-shaped prominence on the corresponding side of the uterine body, from the upper end of which runs the tube. Compared with the normal uterus, the one-horned is smaller; the vaginal portion especially is smaller; in the cervix the *plicæ palmatæ* are nearer to the convex border of the uterus; the broad ligament on the side of the missing uterine half is larger, often of extraordinary size.

The uterine rudiment of the other side presents all the above conditions: it is a solid or a hollow little body; it sometimes lies at a considerable distance from the one-horned uterus in a wide-spreading peritoneal fold; and sometimes it is altogether wanting. The corresponding ovary and tube follow the same rule. The junction between the rudimental and the one-horned uterus presents the greatest diversities. At times there is none. At times there runs from the rudiment a round, or flat-round cord composed of uterine parenchyma in an oblique direction towards the one-horned uterus, and inserts itself into, or above the internal orifice, sometimes higher, sometimes lower. This cord is solid, or contains a canal which connects the cavity of the one-horned uterus with that of the rudimental uterus, and makes this last susceptible of impregnation. But we have seen, especially from Professor Turner's researches, that impregnation possibly takes place even where the structure uniting the rudimentary horn with the developed horn is solid.

Here it may be useful to place the following figure taken from Tiedemann (Fig. 92). It is described as a "uterus strongly developed to the right, the neighbourhood of the isthmus atrophied." It is probably an instance of imperfect development of the left horn of the uterus. In such cases it is probable that the general development of the uterus is also defective. I introduce it because I believe it represents a formation which is not very infrequent. I have many times met with cases in which the uterus resembled this one in size and position, there being a small os uteri scarcely projecting into the vagina. They have been brought under observation on account of dysmenorrhœa, amenorrhœa, or sterility.

When, as already said, the two rudiments constituting the uterus bipartitus are developed equally after the type of the one-horned uterus, there appears an excess of development in the shape of *two uterine halves,* which are fused together from one point of their convex borders in the form of a uterus bicornis. The degree of two-hornedness varies, and is deter-

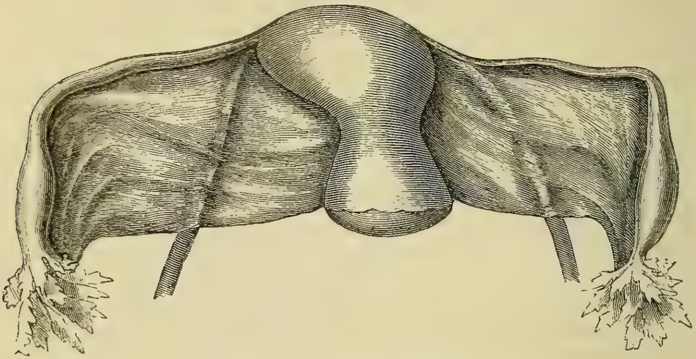

Fig. 92.—(From Tiedemann.)

UTERUS STRONGLY DEVELOPED TO RIGHT. PROBABLY IMPERFECT DEVELOPMENT OF LEFT SIDE.

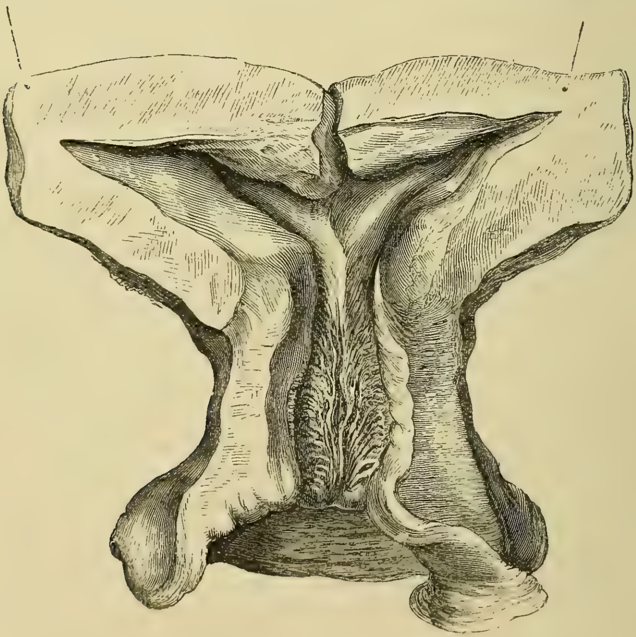

Fig. 93.—(From Nature, from a specimen in Guy's Museum, 2261^{73}.)

DOUBLE OR BICORNUTE UTERUS, WITH A SINGLE CERVIX AND OS UTERI (R. B.).

mined by the spot from which the two uterine halves run together. The lower this is, the more obtuse is the angle of union, and so much the greater is the divergence of the two halves. It falls very rarely below the *orificium internum,* and here the two horns run into one common cervix in such a manner that they lie horizontally. The higher the place of union, the more acute is the angle, so that at last the two-hornedness is nothing more than an unusual divergence of the two horns of the uterus, which exhibits outwardly a somewhat broader fundus, but is otherwise normal. Under these conditions there appears between the two uterine-halves a uterine mass which has the significance of a fundus uteri. The higher this connecting bond between the uterine-halves is, the more prominent is this significance; and when it is on a level with the ends of the uterine horns, and overtops these with its arch, then the two-hornedness has vanished.

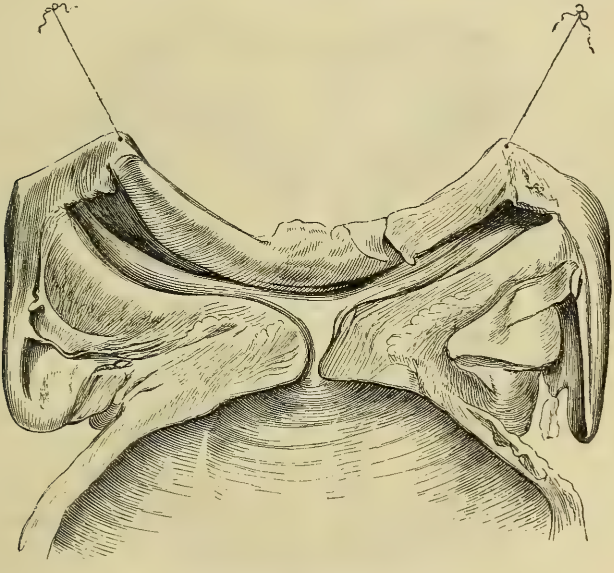

FIG. 94.—(Royal College of Surgeons, ad nat.)

BICORNUTE UTERUS (R. B.).

This is illustrated in Fig. 95, taken from a girl who died of phthisis at the age of seventeen. She was well developed. The Graafian vesicles were numerous and large. The vagina was well-formed. The horns open into a common uterine cavity. The walls are unusually thick; the fundus, although depressed in the centre, indicating the original two-hornedness, is straighter than in Fig. 94.

The bicornute uterus is illustrated in a remarkable specimen in the Royal College of Surgeons, taken from a mulatto (*Physiological Series*, 2828). In this specimen the body of the uterus is drawn out into two long horns, so that the line representing the fundus between the two horns is a long concave arch. More commonly the two horns continue parted for an indeterminate space by a septum descending from the fundus to a variable length. It may reach as low as the os uteri internum, or even the os externum. If the septum is incomplete, it ends below in a sharp edge, but it commonly stretches lower down, along the posterior wall, in the form of a ridge, like a raphe.

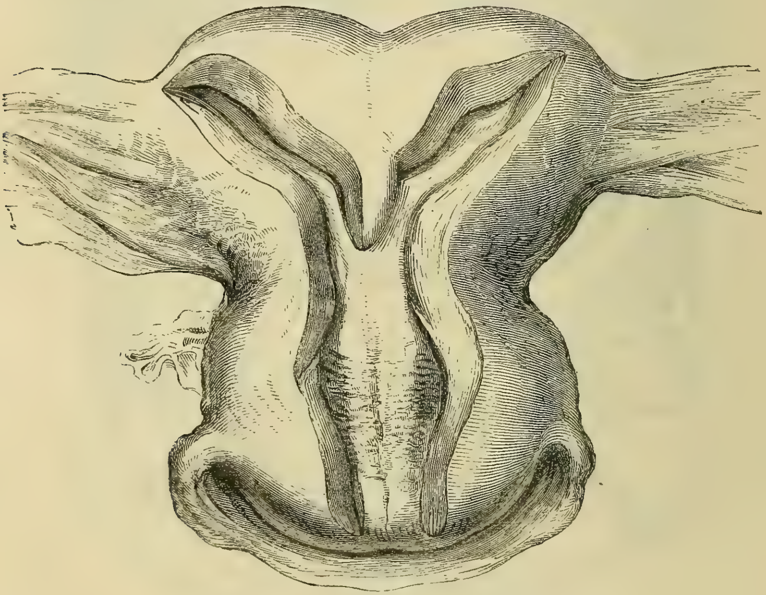

FIG. 95.—(From Nature, from a specimen in Guy's Museum.)

BICORNUTE UTERUS, THE SEPTUM DIVIDING THE UTERINE CAVITY INTO TWO, DESCENDS AS FAR AS THE ISTHMUS (R. B.).

In Fig. 95, also taken from a specimen in Guy's Museum, No.2261^{80}, is seen a double uterus, with a single cervix, so that only one os uteri opens into the single vagina. Such a case might be recognized in the living, by feeling the indented fundus, as well as by the sound, which might perchance enter the two cavities one after the other.

In other cases the division extends along the cervical portion, so that two ora uteri open into one common vagina. Such a case may be very puzzling in labour, as I once experienced.

I was called in consultation to a case of puerperal convulsions, in order to deliver the woman. The surgeon in attendance, using his right hand, always touched the child's head presenting at the os uteri. I, as is my custom, examining with the left hand, could only feel the head through a thick solid wall of flesh. It was not until I followed exactly the clue indicated by my friend that I touched the head, and could apply instruments. There was a double uterus. My finger had first entered the empty side.

In Cruveilhier's magnificent work is a beautiful drawing of a double uterus, taken from a woman who died of puerperal fever. The uterus which contained the fœtus presents much the same appearance as is usual after delivery, in the single uterus. The other uterus is enlarged in sympathy with its impregnated fellow, but is considerably smaller.

In a few very important cases there is atresia of one half of the uterus bicornis.

To the two-hornedness, with formation of a septum, belongs the *uterus bilocularis*, which consists in the septum-formation in a uterus, normal as regards the degree of divergence of its horns. The septum in the uterus bilocularis presents all the variations seen in the uterus unicornis. Its presence is often signified by a greater breadth of the uterine body, and sometimes by a shallow furrow along its posterior wall.

The vagina presents corresponding diversities in the uterus bicornis and the bilocularis. It is normal, or there is a septum, dividing the canal more or less completely into two.

The septum may extend all along the uterus and vagina. The pathological relations of this form of uterus have been referred to in the Section on "Occult Menstruation." The condition is not, I believe, very uncommon. Most museums can show a specimen; and every now and then a living specimen comes under notice, either accidentally or on account of some difficulty in the functions of menstruation or labour. But these difficulties are by no means necessary. Things may go on very well, one vagina and one uterus acting. The Figs. 96, 97, are taken from a preparation (2261^{85}) in Guy's Museum. There is one equally typical in St. Thomas's. The Guy's specimen was taken from a woman aged fifty, who died of influenza; she had been married twenty years, remaining sterile. The tubes and ovaries were matted together by adhesions. The body of the uterus seen externally was single, only a slight depression marking the internal division.

As regards menstruation, conception, and labour, the described forms of uterus behave as follows:—The constituent rudiments of the uterus bipartitus are capable of conception; an accumulation of menstrual blood in the cavity of such a rudiment with dilatation of it may happen. Where such a rudiment is connected with a one-horned uterus by a perforated bond of union, it is capable of conception, and so even when it is solid. The gestation terminates, as in tubal gestation, by rupture, within three or four months. The uterus unicornis and the uterus bicornis, as well as the bilocularis, are capable of conception.

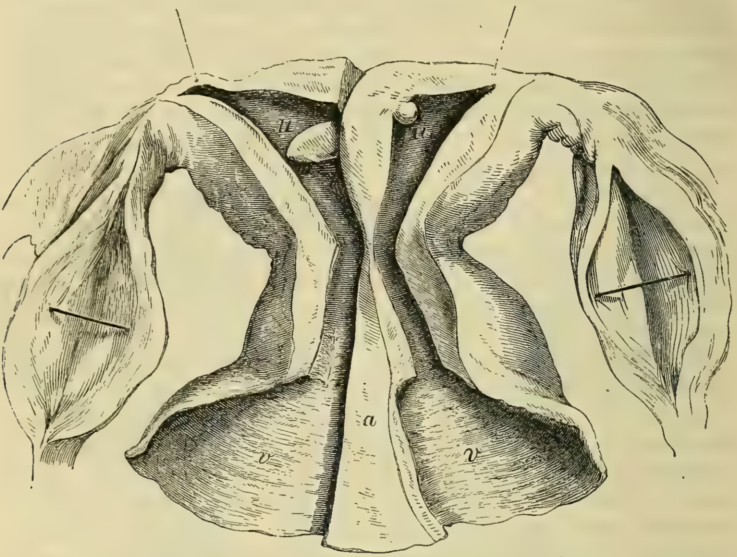

Fig. 96.—(From Nature, from a specimen in Guy's Museum.)

DOUBLE UTERUS AND VAGINA (R. B.).

u, *u*, The right and left uterine cavities, communicating by separate cervical canal and os nto *v v*, right and left vaginæ.
a, The septum of dense fibrous tissue, which runs along the median line.

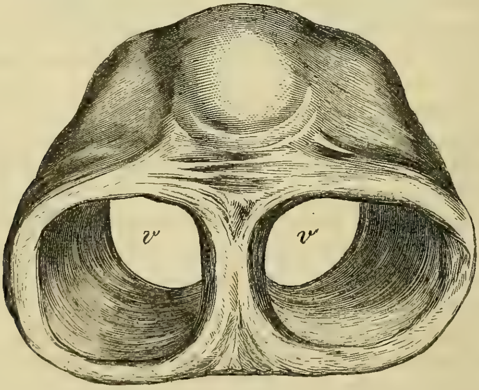

Fig. 97.—(Nat. size.)

TRANSVERSE SECTION OF THE VAGINÆ OF THE SAME SPECIMEN AS THE PRECEDING FIGURE SHOWING *v*, *v*, THE SEPARATE VAGINAL CANALS (R. B.).

In the two last, repeated gestations occur interchangeably sometimes in one, sometimes in the other uterine half. When conception takes place in one half, a decidua is formed in the other half, and grows during the early part of the pregnancy equally with the pregnant half. Moreover, twin-pregnancy may occur, not only in one uterine half, but pregnancy has been observed in the two halves simultaneously. In this case one fœtus is usually arrested in development.

In these uterine forms the ruptures, abortions, tedious labours observed are accounted for by the smaller mass of the uterus, and by the diminution of the uterine fundus.

When there is atresia of one half of the uterus bicornis, retention of menstruation, with its perilous consequences, will occur. Rokitansky relates a case where the fluid retained in the closed half caused perforation of the septum, and discharge into the half which communicated with the vagina.

Abnormal size of the uterus may originate in fœtal life or may arise later, from premature sexual maturity. It consists in *hypertrophy* and *dilatation.*

Hypertrophy affects the whole uterus or only a part of it. As partial hypertrophy, that of the vaginal-portion is especially deserving of attention.

General hypertrophy is commonly so formed that the uterine cavity is uniformly enlarged (*excentric hypertrophy*). In lesser degrees the cavity is often normal, and less frequently it is narrowed (*simple and concentric hypertrophy*). The enlargement attains in the first form considerable degrees, becoming as large as a goose's egg, or a fist, and larger; its walls becoming half an inch or an inch thick. The most important enlargement occurs with connective-tissue tumours which prolapse into the cavity or grow in it. A simultaneous elongation occurs in hypertrophy of the prolapsed uterus. The hypertrophied uterine mass is often like that of the normal uterus, and often the connective tissue in it is increased, and thus its consistency is greater.

Dilatation of the uterine cavity is commonly attended by thickening of its walls (*active dilatation*); and often with thinning (*passive dilatation*). It is generally produced by accumulations within, the result of stenosis or atresia at a lower point. In Guy's Museum (2261^{72}) is a specimen showing dilatation of the body of the uterus with thinning of its walls. A quantity of albuminous matter had collected within it, and the os internum was closed.

Abnormal smallness of the uterus may be the consequence of defective development. The uterus is small from retaining its infantile form, or its growth was arrested. In the latter case it is small throughout, thin-walled, its mucous membrane is thin, its *plicæ palmatæ* very slightly raised. Commonly the other organs, the whole body, are retarded in development, and especially the heart is small.

Atrophy.—The smallness may be due to *atrophy*. This may affect the whole uterus, or simply the cervix, or the vaginal-portion.

Atrophy of the whole uterus follows chiefly upon chronic catarrh in advancing age; often prematurely upon cessation of menstruation; and sometimes even in younger persons, in consequence of the rapid succession of labours. Mostly, the uterine cavity is narrowed (*concentric atrophy*), and here and there, in the cavity, or at the orifices, there are adhesions of mucous membrane. Often, the uterine cavity is enlarged by the accumulation of secretions. When these adhesions exist (*excentric atrophy*) the uterine substance is dense, tenacious; or especially in advanced age, softened, pale, penetrated by rigid, widened, calcified arteries, a condition which disposes to bleedings. (See Fig. 98.) Fibrous tumours also lead to atrophy of the uterus.

Atrophy of the cervix is commonly caused by the dragging which it undergoes from the rising of uterine and ovarian tumours into the abdomen. It is drawn out lengthwise, made thinner; the duplicature of the vagina which surrounds the vaginal-portion is unfolded, and the vaginal roof is transformed into a cone. Then closures of the cervical canal ensue, and even at times a gradual separation of connexion.

Atrophy of the vaginal-portion occurs sometimes after repeated labour.

Mr. Walter Whitehead relates* a remarkable case, in which it seems probable that the uterus and ovaries completely disappeared after labour. A woman, aged thirty-nine, first menstruated at eleven, married at twenty-five, had four children within three years and a half, the first two being born prematurely. Severe flooding took place after the last labour. She had a long convalescence, but there was no history of acute disease. During eleven years menstruation never returned, nor was there the slightest leucorrhœa; she had become quite indifferent to sexual intercourse. For four months previous to birth of last child she had passed large quantities of blood *per anum*. She was a tall, pale, thin woman, with markedly flabby cheeks, and a commencing arcus senilis; the mammæ shrunken and flat, with apparent atrophy of gland-structure. No cervix or uterus could be detected; but a small triangular opening was felt and seen in the position of the os. A No. 12 elastic catheter passed, without any pressure, eight inches through the opening. Every mode of examination failed to detect a uterus. The sound passed through the opening could be felt under the abdominal wall, two inches above the umbilicus. It might be conjectured that the sound went through the fundus of the uterus; but repeated examinations, varied in manner, by Dr. Thorburn, Dr. Lloyd Roberts, and Mr. Windsor corroborated the conclusion drawn by Mr. Whitehead.

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* "Brit. Med. Journal," Oct. 1872.

The following drawing (Fig. 98) taken from Carswell's *Morbid Anatomy* represents a form of atrophy of the uterus connected with calcification of the ovario-uterine arteries.

Obliteration of the uterine cavity is sometimes the result of concentric atrophy; it often results from adhesions following accumulations of mucus, mucous polypi, or connective-tissue tumours.

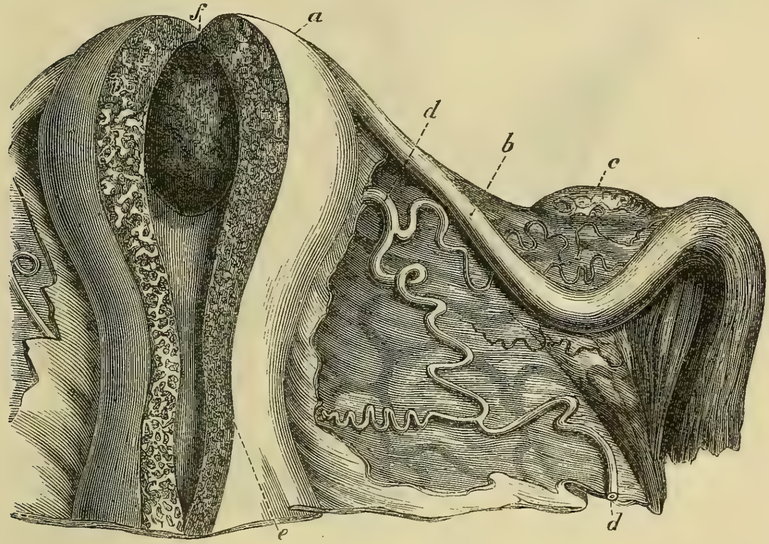

FIG. 98.—(AFTER CARSWELL.)

ATROPHY OF THE UTERUS AND OVARIES FROM OSSIFICATION OF THE ARTERIES.

a, *a*, Uterus laid open; *b*, Tube; *c*, ovary; *d*, *d*, *d*, the principal arteries, and several of their smaller branches completely ossified and nearly impervious; the substance of the uterus *e*, containing a multitude of small arteries in the same state; a tumour *f*, composed of dilated veins and cellulo-fibrous tissue, occupying the fundus of the uterus.

Obliteration of the cervix uteri and of the orifices is commonly caused by closure from pullulating ovula Nabothi. More often the os internum is closed by flexions. Occasionally it is the result of longitudinal dragging of the cervix. The os internum may be closed by cicatrices from lacerations and bruisings, from ulcerative loss of substance, from amputation of the vaginal-portion, from the action of cauteries. In aged women, it not unfrequently closes by a process of concentric atrophy, the margin of the ring of the os uteri getting glued up by dense epithelial scales resembling a membrane.

Fig. 99, from a specimen in the London Hospital, put up by me, represents closure at three different points of the uterine canal.

This uterus came from a woman aged forty-three, married, barren. It is divided imperfectly into three cavities. The upper two, *a*, *b*, are hour-glass shaped; the lowest, *c*, about three-quarters of an inch long, is separated from the middle one by a nearly complete fold of mucous membrane. In the middle cavity, the uterus is deeply furrowed, and studded with large gaping follicles. The atresia was no doubt due to endometritis with follicular inflammation.

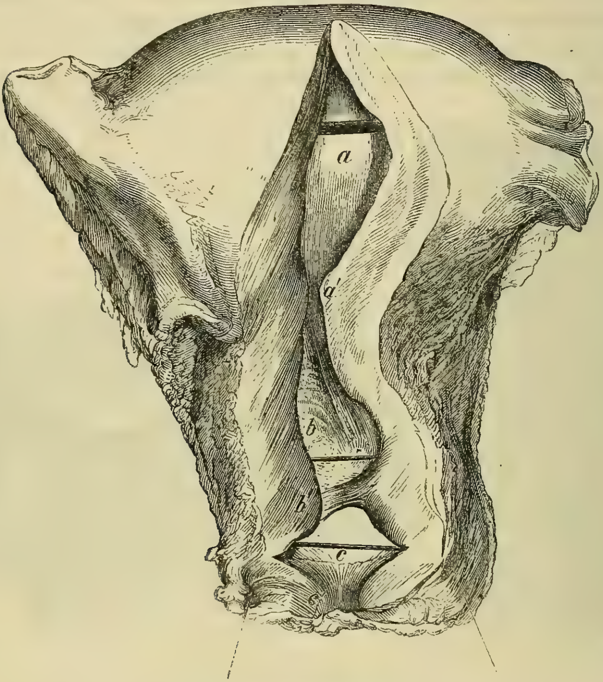

Fig. 99.—London Hospital, Ea. 56, from nat. size ("DR. BARNES").

STENOSIS; ATRESIA; DILATATION OF UTERUS (R. B.).

Abnormities of Shape of the Uterus.—As a congenital anomaly, there occurs the congenital obliquity in connexion with the uterus bipartitus, unicornis, bicornis, and bilocularis. The most marked form of this is seen when one horn with its tube stands higher than the other, and the vaginal-portion is correspondingly oblique. This uterus lies obliquely in the pelvis, inclining to one or other side of the vaginal roof. (See Fig. 92 from Tiedemann.) The broad ligament of this side is narrower, and the ovary lies nearer to the uterus. Sometimes this uterus is bent in an angular form on that side which is highest. Often the higher side is more dense and bigger.

There are asymmetrical forms of the uterus caused by excessive development of one half of the body of the uterus. When there is bending on this side, the retort form is produced.

Among acquired malformations, there is obliquity from one-sided dragging of a fibrous tumour, or an ovarian tumour, from dragging in hypertrophy of the vaginal-portion, from scars, from various accumulations in its cavity, and from inflammatory adhesions in one broad ligament.

CHAPTER XVIII.

GENERAL OBSERVATIONS ON UTERINE PATHOLOGY; EFFECTS OF LABOUR AND LACTATION; INVOLUTION IN DEFECT AND EXCESS.

In studying the pathology of the uterus, it is especially necessary to keep in constant view the peculiarities of structure and the physiology of the organ. No organ in the body undergoes such remarkable physiological changes. At each menstrual period there is increased vascularity, increased volume, increased muscular energy, the development of new tissue, followed by a retrograde process of involution, which effects the return to the ordinary state. At every pregnancy the changes wrought are more wonderful still. Under its physiological influences, the uterus is thus continually subject to alternate hypertrophy and atrophy, or more strictly speaking, involution. The mucous membrane is endowed with extraordinary regenerative power. And these active reproductive and solvent forces inherent in the uterus are constantly ready to be called into action on any abnormal stimulus. Thus, if a fibroid tumour form in the uterine wall, or project into its cavity, the vessels and tissues respond just as they do to the stimulus of impregnation.

Interruptions, then, to the fulfilment of the organic changes evoked by function will account for a large proportion of the cases of uterine disease, especially congestion, engorgement, hyperplasia, hypertrophy, atrophy. Continually recurring functional acts will also exert an influence, generally injurious, sometimes beneficial, upon morbid existing conditions.

Perhaps there is no organ in the body more prone to hypertrophy than the uterus. Its functional hypertrophy has often been likened to inflammation, notably that hypertrophy of the mucous membrane which results in the formation of the decidua.

The diatheses also must not be overlooked. When one of these exists, it may be the primary cause of the development of disease in the uterus; or, if one of them happen to complicate uterine disease which has arisen from other causes, it will impress its stamp, it will greatly increase the difficulty of cure, and will, therefore, dictate largely the course of treatment. The strumous, dartrous, or herpetic, rheumatic or gouty diatheses, or the syphilitic, tuberculous, or cancerous cachexiæ often play a most important part in the production, continuance, and curability of uterine diseases.

The uterus is liable to alteration of structure and disturbance of function from causes external to itself. Some of these may take their rise in distant organs, some in neighbouring organs; and the uterus, as an integral part of the whole organism, is subject to the constitutional disorders which affect the body, and to the disorders ensuing upon the multitudinous varieties of toxicohæmia. Thus the uterus is liable to tubercle. The blood dyscrasiæ which dispose to hæmorrhages from the mucous membranes are perhaps more likely to induce hæmorrhage from the uterus than from other organs. This is especially true during the period of sexual activity. Thus scurvy, small-pox, measles often cause uterine and tubal hæmorrhages.

Certain medicinal substances or poisons circulating in the blood act with special intensity upon the uterus.

The uterus is remarkably susceptible to nervous impressions, emotional, reflex, and so-called sympathetic; and through these nervous impressions it is certain that functional and even structural disturbances are produced. The uterus stands in the most intimate correlation with the ovaries and breasts. With the ovaries it is directly associated by its vascular supply, which may be said to be common to both organs. The vessels supplying both so freely anastomose that it is impossible for hyperæmia to exist in the one without involving the other in a similar condition. This is most strikingly manifested in the uterine hyperæmia evoked by the ovarian menstrual nisus; but it is almost equally clear that what is called ovarian dysmenorrhœa reacts upon the uterus also.

The application of the suckling infant to the breast often causes contraction of the uterus. I have often known it cause uterine hæmorrhage. Many women are conscious of pain in the uterus when suckling. The application of leeches, blisters, or cupping glasses to the breast has brought on menstruation. This was known to Hippocrates.

Obstinate *pruritus pudendorum,* by keeping up a constant excess of blood and local nervous disorder, not seldom brings about a congestion, enlargement, or infarctus of the uterus.

The uterus in its turn is the starting-point for manifold affections of the distant organs, and of the general system. I do not in this work more than glance at the influences which the pregnant womb exerts. Those which spring from the non-pregnant womb are scarcely less striking.

The uterus is especially liable to change of structure and disturbance of function under the influence of changes affecting its neighbouring organs. Floating, as it does freely, between the bladder and the rectum, it is subject to constant change of position, according to the varying conditions of fulness or emptiness of these organs. Of course, so long as these conditions are within physiological limits, the uterus adapts itself readily to them; but if the natural mobility of the uterus be impeded, as by plastic deposits about the broad ligaments, by blood-masses and plastic deposits in the retro-uterine pouch, by tubal gestation, or by any body becoming attached to it, uterine hyperæmia proceeding to infarctus or hypertrophy is sure to follow. In every case of pelvic peritonitis, or so-called pelvic cellulitis, the uterine walls are found thickened. This is a frequent cause of secondary puerperal hæmorrhage, and of hæmorrhage continuing for months after labour as menorrhagia. This, it may be said, is due to arrested involution from the state of pregnancy, this form of inflammation commonly arising after labour or abortion. But I believe this is only one particular instance of a general law. The same state of engorgement and hyperplasia is observed, no matter what the cause which fixes the uterus. This fixing and the attendant changes in the circulation of the organ account in great part for the enlargement of the body of the uterus, which takes place when cancer invades the neck. If inflammation begin in the broad ligament or in Douglas's pouch, not spreading to the uterus, but fixing it by external deposits, enlargement equally follows.

The uterus, also, I have observed, is liable to hyperplastic enlargement, as the result of oft-repeated or long-continuous hyperæmia produced by disorder of the liver, kidneys, or heart.

We shall find the history of the natural changes ensuing upon menstruation, pregnancy, and labour to be a necessary introduction to the right appreciation of engorgement, inflammation, hypertrophy, prolapsus, versions and flexions of the uterus, and of other uterine and peri-uterine affections. This history, then, which really includes the study of the etiological relations of so many disorders, will here be briefly traced.

EFFECTS, LOCAL AND CONSTITUTIONAL, OF LABOUR AND LACTATION.

A very large proportion of the cases of uterine disease which come under treatment are the result, more or less immediate, of parturition. To understand this aright it is necessary to study what are the effects of parturition upon the uterus. Parturition is a violent process. Even in ordinary labour the dilatation of the cervix uteri is effected in great part by the direct pressure of the head or other part of the child. In many cases the pressure thus exerted amounts to severe bruising, contusion of tissue, attended by a partial sliding, a glacier-like movement of the mucous membrane, away from the subjacent tissues. This traumatic process necessarily involves the rupture of many small vessels, producing ecchymosis and serous effusion in the connective tissue, and even in the wall of the cervix. That the edge of the os externum uteri is almost constantly torn in first labours is notorious. The peculiar distress arising from this rent has been well studied by Emmet.

Impeded Involution.—The first in time, if not in importance of the results of labour, is the persisting enlargement of the uterus, which marks the failure of the process of involution. Within a month the uterus ought to complete its return to the ordinary state; that is, it ought to recover from a bulk represented by one and a half pounds weight or more to two or three ounces. This wonderful change is brought about chiefly by two processes. The first is one of active and tonic contraction of the muscular fibre, which by diminishing the bulk of the organ, squeezes out of its vessels all superfluous blood. The second process is a compound one of absorption and excretion. The now useless solid tissue is first converted into granular fat, then absorbed into the circulation, and lastly ejected from the organism by the glandular apparatus. Both these processes are liable to be impeded. The first and most essential act, that of vigorous and persistent muscular contraction, is often badly performed. A degree of hæmostasis remains, which keeps up congestion, disposing to hæmorrhage and inflammation. The excessive bulk and weight of the organ occasion local distress. This condition, moreover, retards the second essential process of absorption. And if to this be added, as is too commonly the case, feeble glandular action and weak nutrition, involution is seriously retarded.

Besides mere want of power, other causes may concur in frustrating the due involution of the uterus and vagina ; and these it is desirable to enumerate. Associated under the general term, want of power, we of course include the influence of accidentally complicating diseases, as fevers, phthisis, and of the cachexiæ, as struma and syphilis. Under the influence of these diseases involution rarely goes on well. A marked excess of bulk, with chronic endometritis, may be observed for weeks and months. Flooding during and after labour, by weakening general power, and especially by impairing tonicity of muscular fibre, retards involution. The occurrence of perimetric inflammation during childbed, especially if attended by effusions which impede the mobility of the uterus, surely retards involution. Indeed, I think it may be laid down as an aphorism that whenever the mobility of the uterus is arrested, whether the cause be external or internal, a degree of hyperplasia is the result. Thus, as in the case just mentioned of perimetritic adhesions, imperfect involution and a process of slow infarction follow. In the case of ectopic gestation where the fœtal sac comes into adhesion with the uterus, the primary development of the uterus under the stimulus of conception is maintained, and even exaggerated. When peritonitis and adhesions form from malignant disease, the uterus is always increased in bulk, and this increase is greatly due to this cause, not alone to the direct influence of the malignant disease.

The inevitable injury inflicted upon the cervix, and especially upon the vaginal-portion, may evoke such an active process for repair that general involution may be impeded.

Displacements of the uterus also impede involution; and displacements are very apt to occur after labour. The most common displacements are retroversion, retroflexion, and prolapsus. When one of these occurs the free circulation through the uterine vessels is necessarily interrupted. The arteries may pump in blood, but the return by the veins is obstructed by the tortuous course and angulations produced by the displacement. Hæmostasis, frequent metrorrhagia, arrest of involution, and continuous infarction are the result.

Fibroid tumours, or polypi in the uterus, retard involution, by keeping up a developmental attraction of blood. There is a kind of spurious gestation.

I am disposed to fix the normal period required for complete involution at one month. But this applies to persons in health, and placed in favourable circumstances. Hospital air is an unfavourable condition; and I am told that in the lying-in hospitals abroad six weeks is the time usually required.

The reduction in size which the uterus has to undergo, and the brief space within which this change has to be effected, constitute one of the most striking facts in physiology. At the full term of pregnancy the cavity of the uterus, says Simpson, contains above 400 cubic inches; and in the non-pregnant it can hardly be said to be equal to one cubic inch. Yet to this latter capacity the uterus must be reduced in a month.

The extent of involution of the uterus after labour may be accurately traced, by observation, by touch, and by measurement with the sound. The following diagram (Fig. 100), from Simpson, gives an idea of the ordinary difference in bulk of the uterus in which involution has been arrested, and that of the uterus in its ordinary state.

The uterus is especially enlarged in the antero-posterior diameter. Its walls are thickened. The cavity is larger, and in many cases the walls not coming into contact as in the normal state, there is an actual cavity in the body of the uterus, in which the sound will revolve.

A considerable part of the bulk of the uterus in sub-involution is due to infiltration of fluid, as serum, in the tissue, and to blood partly stagnant in the capillaries and veins.

Treatment, Prophylactic.—By proper care immediately after labour and during childbed, involution may be effectively promoted. The first care is to see that the uterus is emptied of placental-remains and clots. The second point is to secure firm contraction, by compression, and by the administration of ergot, quinine, digitalis, or strychnine. For many years it has been my practice to give these remedies two or three times a day from the very first. They help not only to lessen the remote dangers of imperfect involution, but also the immediate danger of septicæmic puerperal fever. The third point is to support the strength of the patient by liberal diet. The fourth is to insist upon *rest* for two or three weeks. And lastly, to be satisfied that the uterus is not prolapsed or retroverted. If retroversion or retroflexion, a very common condition in childbed, is allowed to continue, involution will surely be arrested.

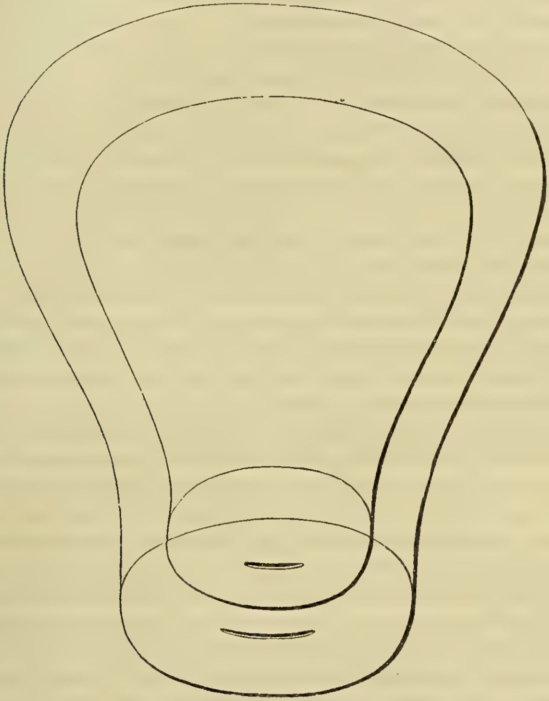

FIG. 100.—(AFTER SIMPSON.)

The outer outline represents the bulk of the uterus arrested in its involution after pregnancy. The inner one represents the bulk it ought to attain.

The evidence of the *traumatic injury sustained in labour* remains in the indented cicatrices round the margin of the os, which are characteristic of the vaginal-portion in women who have borne children. But if the parts be examined soon after labour, much more striking marks of the injury they have sustained will be witnessed. Immediately after labour the vaginal-portion is large, flabby, pulpy, so as to be almost indistinguishable to the touch. It is often some days before it retracts to any considerable extent, or regains much firmness of texture. The tissue of the cervix and of the connective tissue surrounding the vessels at their entry from the broad ligaments is infiltrated with serum, which has to be absorbed. The entire thickness of the vaginal-portion, as I have repeatedly seen in post-mortem examinations, at the end of a week or even ten days after labour, is still soft, large, and black from ecchymosis.

It must also be remembered that the vagina during pregnancy and labour undergoes changes analogous to those which affect the uterus. During pregnancy the extreme vascularity of the vagina gives a characteristic test of this condition. Its walls grow in length and breadth; its tissues become softer, and more distensible. To the touch this is very perceptible. During labour it is subjected to enormous distension, and even violence. Involution will be arrested under the same conditions as those which arrest involution of the uterus. The vagina then remains larger and looser; folds may even project through the vulva. Thus we get a heavier uterus, which has to be supported by a vagina of less than usual power.

Under favourable circumstances, the process of repair is rapid and complete. But in a great number of instances, the conditions are not favourable. Repair is retarded by a weakly state of the constitution, by the intercurrence of various morbid actions, by imprudence in getting about too soon, and the too early resumption of ordinary duties. I am persuaded that *rest, physical and physiological,* for at least a month after labour, is essential to complete the repair of the injuries sustained, and the involution of the pelvic organs. This proposition will perhaps appear overstrained in the opinion of those who advocate a generous diet from the day of labour, and removal to the drawing-room in less than a week. I have so frequently seen pernicious effects, immediate and remote, from this practice, that I cannot hesitate to condemn it. It is easy to adduce any number of cases of women who have been thus treated, and have made good recoveries. But the practice is not thus justified, if the exceptions also are numerous. It is true, that many women return to their ordinary mode of life within a fortnight, and continue with more or less success to perform their duties. But the frequent penalty is uterine and constitutional disease. The speed and completeness of recovery from labour depend also greatly upon the health and physical power of the individual. Women accustomed to hard work, hard living, and exposure to the weather, complete the process of repair much more quickly than those who are nursed in luxury, and whose first experience of hard work is acquired in the task of bringing forth a child. In the first class of women, the muscular, vascular, and glandular systems are in vigorous working order. Effete matter is quickly got rid of. Every organ soon returns to its wonted state. In delicate and pampered women, on the contrary, the muscular fibre is lax, the glandular organs, especially those of the skin, including the breasts, are imperfectly developed; they do their duty feebly, and are easily overpowered when an unusual strain is thrown upon them. The nervous system is stimulated beyond measure, and acquires predominance over the rest. Under these conditions it is not surprising that the extraordinary revolution in the system, and the important local changes which have to be effected after labour, are accomplished with difficulty, imperfectly, and are the point of departure for various constitutional and local morbid processes.

Neglect of the due period of "rest" for repair is especially apt to retard the restoration of that part of the uterus to which the placenta adhered. The changes that have to be effected here are more extensive than in the rest of the internal surface. It is no uncommon thing to see in women dying a month and more after labour, a rough area, marking the site of the placenta. This is often covered with a muco-purulent secretion, showing that the return to the ordinary condition is not completed. It is easy to understand that to tax the uterus in this condition with the premature resumption of functional work, will start endometritis, which will readily assume a chronic, and even permanent character.

Analogous conditions follow abortion, although the actual violence inflicted upon the cervix is not so important an element. Abortion also differs from labour at term in this respect: the development of the uterus is brought to a sudden termination prematurely—that is, before the tissues and the system have attained the conditions favourable to rapid and complete involution. Within the first three or four months, for example, the muscular contractibility of the uterus—a prime agent in starting healthy involution—is not nearly so effective as at term; and, in addition to this, the transformation of the mucous membrane into decidua, is arrested at a stage when the adhesion to the uterus is much more intimate, more vascular, and embraces a relatively much larger area. Its separation is a far more violent process; and if, as is not unlikely, the mucous membrane was unhealthy before conception, its separation will be apt to leave a subacute endometritis, with unhealthy new mucous membrane.

Rest is as essential after abortion as after labour. The indifference with which many women in every rank regard "a slight miscarriage," is a source of much future trouble. A miscarriage is looked upon as slight in proportion to the earliness in pregnancy at which it occurs. But it is a grave error to measure in this way the importance of an abortion. The earliest abortion may entail consequences far from slight, if due hygienic precautions are not observed.

Now, one of the surest means of inducing some one or more of the foregoing involution-retarding conditions, is premature exchange of "rest" for exertion. The upright posture within the first week or fortnight will surely increase the local vascular tension, and promote displacement of the uterus. To add the influence of gravity, and of increased hydraulic pressure in the vessels whilst the uterus is still of inordinate weight and softness, with its supports disabled, cannot fail to be injurious. The most healthy stimulus to uterine involution is the natural function of lactation. If this duty—this physiological complement to parturition—be neglected, involution will not go on smoothly. The application of the infant to the breast causes contraction of the organ. It is injurious to lose this. Lactation, moreover, causing a derivation of physiological activity to a distant organ, tends to promote rest in the pelvis. Indeed, one of the beneficent purposes of this alternative or cyclical action of the generative organs, is to give each in its turn the rest that is necessary for restoration. This natural order cannot be broken with impunity. The penalty, or rather, one of the penalties, of suppressing the function of the breasts, by depriving the uterus and ovaries of their allotted respite, is the resumption of work before they have had time or opportunity to recover their fitness for the task.

It is to this evil that women of the easier classes are more especially exposed. The increasing neglect of the function of lactation is, I believe, a prolific cause of uterine disease. This neglect does not, however, entirely arise from indifference to maternal duties, or the fancied more imperative duties of social life. The inability to suckle is, in numerous cases, real. The system, the breasts want the power, the capacity, to secrete milk. After honest endeavours, it is too often found that after a few weeks of scanty secretion and painful suckling, the child and mother alike show evidence of the futility of the effort. Nothing can lend stronger confirmation to the theory I have expressed, as to the relative unfitness of women nursed in luxury to carry out in its completeness the function of reproduction, than this failure of the breasts. The breasts are glandular organs developed out of the skin. They are closely analogous in structure to the sebaceous glands of the skin. Their activity and degree of development may be taken as a measure of the activity of the skin and other glandular organs. All show the same kind and degree of incapacity. Unless the general system have been duly exercised and called into activity by the whole course of life, the glandular system, like the rest, will remain imperfectly developed. It is unreasonable to expect the breasts to become all at once competent to their work.

On the other hand, there frequently occur amongst the working classes and others, cases where involution of the uterus is arrested by lactation. This is because lactation is a task that exceeds the strength. Deficient food, bad health, and hard work combine to exhaust the struggling mother. The process of repair is arrested, and a chronic endometritis, with engorgement, abrasion of epithelium from the os uteri, and leucorrhœa, sometimes tinged with blood, or even alternating with metrorrhagia, always more or less prolapsus or retroversion result. The worn, thin, pallid aspect of the subject attests exhaustion. The pulse is small, accelerated; nutrition is feeble; the muscles are flabby; at one point muscular debility is invariably marked. the dorsal muscles, especially between the scapulæ, are always painfully aching; they are in fact overstrained by the heavy burden of carrying the child. The nervous system in many ways suffers from imperfect nutrition; vertigo, syncope, are the sure signs of anæmia, and show how the brain is starved; dimness of sight, muscæ volitantes, every degree of amaurosis commonly attend.

Mr. Jonathan Hutchinson has investigated this subject. He says that dimness of vision during suckling may be merely an indication of the existence of hypermetropia, and does not necessarily indicate retinal disease. Until weakened by lactation, many hypermetropic women experience no inconvenience, being able to bear the accommodative strain necessary to overcome the error of refraction; but during lactation they find it difficult to keep the ciliary muscle up to its unusual exertion. He says it is well to examine if spectacles are not requisite.

Any nervous affection to which the subject retains a predisposition, from antecedent attacks, or from hereditary transmission, is now extremely apt to break out. Thus, over-lactation induces a recurrence of epilepsy, chorea, hysteria, ague—affections from which the subject might otherwise have been freed.

Another point of suffering is the lower lumbar and sacral region. This is partly the indication of reflex distress, proceeding from the diseased uterus, partly of pressure of the enlarged organ on the pelvic nerves, and partly of spinal exhaustion from the constant wear and tear occasioned by the irritation of a diseased organ acting upon an imperfectly nourished nervous centre.

These subjects will also frequently complain of pain referred to the seat of one or other ovary, most frequently the left. Dr. Henry Bennet has long insisted upon this as characteristic of irritation propagated from the inflamed cervix. It may, according to him, and I am disposed to agree with him, be regarded as a consensual pain. Others, however, regard it as an indication of actual ovarian inflammation.

The period when over-lactation may be said to have begun cannot be fixed. It is determined by the relative strength of the individual. Whilst it may be said that few women are able greatly to transgress the normal period of nine or ten months with impunity, it is certain that many show all the signs of over-lactation much earlier than this. We must, then, look to the symptoms, and not to the time the patient has been suckling.

In a considerable proportion of cases, the functions of the ovary cannot be suppressed beyond a few months, if at all. It is in vain that the attempt is made to keep ovulation, with its consequences—menstruation and pregnancy—in abeyance by taxing the breast. The ovary is the dominant organ, and sooner or later will assert its supremacy. Accordingly, we often find one of two things taking place in the course of lactation. First, menstruation returns, sometimes in a few months after labour, and generally within a year, except, indeed, phthisis or other exhausting disease intervene, or premature atrophy of the ovaries and uterus be induced; or, secondly, unless a new pregnancy occur. This may, or may not, be preceded by a menstrual appearance. Some women "never see anything from one pregnancy to another." Whilst suckling, they fall pregnant, without exactly knowing when. The position of a woman in this predicament is indeed trying. She is labouring to support three beings at the same time. She is goading into simultaneous work the breasts and the uterus, which ought to relieve each other. No wonder if, under this double outrage to Nature, her own strength break down, and if the welfare of the child at the breast, and the existence of the embryo in the womb, be equally imperilled. Accordingly, we often observe that abortion occurs under these circumstances. This accident is the combined result of the degradation of the mother's blood, which becomes unfitted to carry on the nutrition of the embryo and of the structures which bring it into relation with the mother; of the reflex irritation constantly starting from the breast, and promoting congestions and contractions in the womb; and of displacement, such as prolapsus or retroversion and chronic metritis.

The condition of the uterus after the exhaustion of over-lactation is usually characteristic. Its bulk is somewhat excessive; the body is thicker and softer; its canal is patulous, easily admitting the sound; the cavity of the body is a little dilated, so that its walls are not in apposition, as in the healthy uterus; the appearance of the vaginal-portion is peculiar: its aspect is pallid, partaking of the general anæmia, its lips are swollen out in lobes separated by the scars resulting from the slight rents which were produced during labour; to the feel and sight the tumid os is flabby, soft, as if œdematous; all round the os, and some way inside the cervical cavity, the epithelium is often abraded; tenacious viscous mucus fills the canal; the sound always causes a little oozing of blood; and metrorrhagia is usual. Such is a common condition. Sometimes there is great congestion and appearance of vascularity. The abraded portions present little granulating elevations, secreting a semi-opaque mucus. The margin of the abrasion is well defined; where the structure retains its epithelium-investment the colour is bluish or purple. This colour becomes much deeper if pregnancy has supervened.

Although ready to sink from physical exhaustion, the mother still clings to the burden which is dragging her to the ground. It often requires the most decisive authority the physician can exert to induce these poor women to give up the unequal struggle. The most effective argument often is to point to the child, which is generally pale, thin, deficient in the firmness of healthy nutrition. We may thus more easily persuade the mother to give up a course which, whilst surely sapping her own health, is doing her child no good.

Treatment.—To wean, then, is generally the first injunction. The other indications are to restore the general health, to improve nutrition, to bring back the proper proportion of red-globules to the blood, and at the same time to cure the local disease.

In these cases quinine and iron are of inestimable value; strychnine is of scarcely less. They almost take rank as food. The doses should not be large, especially at first. One, or at most two, grains of quinine two or three times a day, and one-thirtieth of a grain of strychnine is enough. More will not be tolerated if the exhaustion is great. Quinine has a special beneficial action beyond that as a general tonic. It has a distinct property in causing contraction of the uterine fibre. In this way it promotes involution, the diminution of congestion, and the tendency to metrorrhagia. To produce this action larger doses are useful, and combination with ergot is of advantage. Strychnine possesses a similar property in a marked degree. That the diet should be as generous as can be digested, it is needless to say. Alcohol should form a moderate, strictly limited ingredient. The light wines of France, the Rhine, and Hungary are the best stimulants and aids to digestion. But where it can be digested, good stout or ale to the extent of a pint or two pints daily is to be preferred. Cod liver oil and iron are often of use. Under this regimen, the blood is speedily enriched in quality, and the effect is seen in returning strength, in improved nutrition, and more vigorous performance of all the functions. We shall thus have gained one necessary condition for the repair of local mischief. Without this improved constitutional power, mere local treatment would probably fail.

The local treatment required is generally simple. One condition is rest. This is partly attained by keeping the prolapsed uterus at its proper level by means of a Hodge's pessary. This brings singular aid also by relieving the local hyperæmia, by facilitating the return of blood from the uterus. Once every four or five days the abraded surface of the vaginal-portion and the interior surface of the cervix uteri should be lightly touched with tincture of iodine. Or a stick of three grains of sulphate of zinc may be introduced every third or fourth day into the cervix. A vaginal injection of oak bark, tannin, or sulphate of zinc, or alum should be used daily or even twice a day. The cold douche, if it can be borne without pain, is often useful. In summer the cold hip-bath may be employed.

Under this treatment the abraded surface will commonly heal over; the congestion disappearing, the bulk of the cervix becomes reduced; the tendency to prolapsus is lessened by this diminished weight of the organ, and by the recovered tonicity of the vagina and other uterine supports. If at this time, when all active inflammation has ceased, any marked degree of enlargement of the vaginal-portion and bearing down remain, we find a useful remedy in the *potassa cum calce* or Vienna paste. This should be rubbed gently across the most enlarged lip of the os uteri, so as to produce a small eschar. This sets up a moderate degree of local irritation which stimulates to healthy granulation, and excites absorption. The raw surface will cicatrize within a week or ten days, and the bulk of the vaginal-portion will commonly be reduced.

This treatment, although limited to the vaginal-portion and the canal of the cervix, exerts a beneficial action upon the enlarged body of the uterus. It is certain that the congested, inflamed state of the vaginal-portion keeps up a similar condition of the whole organ; and it is also a matter of experience that remedies applied to the vaginal-portion act not only by removing the irritation of contiguous disease, but also by derivation. The eschar, for example, set up by *potassa cum calce* upon the os uteri, acts by derivation upon the body as a blister does upon internal organs.

To set involution going, when the case is acute, Simpson recommends local antiphlogistics. This treatment is especially indicated where any trace of inflammation remains. But in cases where all inflammatory action seems to have died out, he says, a local antiphlogistic course has the effect of setting up absorption in the enlarged organ. If the patient is not very weak, he advises the application of a dozen leeches to the vaginal-portion of the uterus or to the perineum.

In these more acute cases, and in all the more chronic cases, he insisted on the use of counter-irritants. Antimonial or croton ointments, or the cantharides blister applied to the hypogastric region, or painting this region with tincture of iodine until it produced vesication, were amongst his remedies. At the same time he kept the vaginal-portion of the cervix uteri immersed in ointments of mercury or iodide of lead, or bromide of potassium introduced as vaginal pessaries. As internal remedies he relied upon iodide and bromide of potassium.

Scanzoni recommends the introduction into the vagina every night of a sponge saturated with a solution of iodide of potassium in glycerine, in the proportion of one in eight, or of an ointment consisting of five grains of iodo-chloride of mercury in an ounce of lard. I have found the iodine of glycerine decidedly useful. The patient may apply it herself by the aid of my speculum. (Fig. 54, p. 166.) But as I have found solvents act better if applied more directly, my practice now is to introduce into the cavity of the uterus twice a week during intermenstrual periods a little iodide of mercury ointment, or tincture of iodine, by help of the tube. (Fig. 52, p. 164.)

I have also seen reason to think favourably of the use of the bromo-iodic waters of the Woodhall Spa.

One is frequently asked "How long will it take to get well?" To this the physician can give no definite answer, unless all the conditions of cure be placed fairly within his control. Whilst the patient is pursuing more or less actively her usual course of life, and the treatment is often interrupted, the disease may linger for any length of time. But take her into hospital, where all the necessary measures, negative and positive, hygienic and medical, are systematically carried out, and a cure within two or three months may with confidence be predicted.

Closely associated with this subject is that of *inflammatory engorgement and abscess of the breast.* This condition is commonly the result of, and bears evidence to, constitutional debility, and unfitness of the breast for its function. It occurs at two distinct periods. The most common is at the onset of the attempt to suckle. The other period is after lactation has been kept up for some months. Strumous women, who are especially liable to glandular and connective-tissue engorgements, are particularly liable to early abscess of the breast. The constitution and the organ at once rebel. If the attempt to force them be persisted in, phlegmons and abscesses are sure to form. It is not within the scope of this work to discuss the physiology and pathology of pregnancy and childbed. I refer to lactation only in reference to our present subject. Much as, both in the interest of mother and child, it is desirable to suckle, it is better, where the function is not likely to be successfully carried on, not to make the attempt.

It is rare for abscess to form where no attempt to suckle has been made. The constitutional conditions which contra-indicate lactation are general debility, anæmia, a strumous diathesis; the local conditions are, depressed undeveloped excoriated nipples, or evidence of phlegmons in the breasts. These conditions, and others, lead to retention of milk. The secreted milk clogs the milk-ducts, and this condition leads to stasis, and inflammation in the capillary network surrounding the acini. When it has been determined to abandon lactation, it is a common practice to apply belladonna to the breasts, under the belief that this drug possesses the property of drying up the milk. I very much doubt its efficacy. I have more faith in the internal use of iodide of potassium. To check secretion, Dr. Altstädter extols conium, given in one or two-grain doses four or five times a day. The distinct indication is to avoid stimulating or exciting the breasts. If it be desired not to promote the secretion of milk, the breasts should be kept in perfect rest. It is in carrying out this indication that the physician will experience the greatest difficulty. It is a conviction rooted in the minds of nurses with all the tenacity of prejudice, that friction, and that not always gentle, and "drawing the breasts," are necessary. This infallibly keeps up irritation. Engorgement and inflammation are too apt to follow. One condition of rest is repose in bed, another is gently supporting the breasts, so as to obviate any tendency to hanging down; they should be kept well lifted up from below and from the sides. The easy return of the blood from them thus diminishes the risk of stagnation. Another way to promote rest is to use the arms as little as possible. If there be any engorgement, it is well to keep the arm of the affected side in a sling. Cooling lotions, as of acetate of ammonia and alcohol, are useful. It is only when there is great tension that the overflow should be gently abstracted by a breast-pump, or, better still, by the soda-water bottle heated by hot water, and then applied empty, so as to draw by vacuum. This is far safer in the hands of an ordinary nurse than the breast-pump. Saline purgatives, with digitalis, and moderate unstimulating diet, especially postponing the conventional stout, are essential adjuncts.

When mammary abscess occurs after lactation has been carried on for several months, this is almost certainly because the system has been so reduced that it is no longer fit to keep up the function.

Simpson described (*Med. Times and Gaz.*, 1861) *super-involution of the uterus* as a morbid state the opposite of *sub-involution*. It is produced when the disintegrating process set up after delivery goes on to such an excessive degree as to reduce the uterus to a size decidedly below its normal dimensions in the unimpregnated state. He relates a case of a woman aged 20, who never menstruated after her first labour. Two years after labour she was admitted to the Edinburgh Infirmary. There was amenorrhœa, great constitutional disturbance, frequent attacks of diarrhœa, which she believed to be most severe at recurring monthly intervals, the dejections being sometimes tinged with blood. The mammæ were shrunk and flat. The uterus was small; its cervix much atrophied, os contracted. Sound penetrated 1·5″. Albuminuria and dropsy preceded death. The uterus was one-third below the natural bulk; the ovaries were atrophied, showing no Graafian vesicles.

Sometimes atresia from cicatricial closure of the uterus is followed by a true amenorrhœa—not simply retention. Dr. Lizé reports such a case in the *Union Médicale,* 1863. The uterus seems to become atrophied from obstruction to the performance of its functions.

In various parts of this work, this process of hyper-involution or premature atrophy is referred to. I believe it is far from uncommon. Sometimes, as in the case quoted from Mr. Walter Whitehead (see p. 470), it may go to the extent of removing the uterus altogether.

I have encountered it sometimes with partial success by the use of the galvanic pessary.

RESULTS OF INJURY TO CERVIX UTERI DURING LABOUR.

If we pursue the clinical, and, in this instance, the historical order, in the study of the most common morbid conditions of the uterus, we shall find succeeding the first stage of tumefaction, ecchymosis, and congestion of the mucous and sub-mucous tissues of the cervix, and the shedding of the bruised epithelium, the following condition. The whole cervix, especially the vaginal-portion, is sensibly enlarged, tumid, gorged with blood, œdematous; for a definite area around the os, the part is bared of epithelium, giving a pulpy granulating appearance to the part; this part is further divided into lobes or prominences, the result of the small lacerations which took place during the passage of the child; this bared part is red, angry-looking from the villi being full of blood, bathed with viscid and purulent-looking secretion; the part of the vaginal-portion, beyond the line of epithelial denudation, looks bluish red, owing to the gorged blood-vessels being seen through the epithelial investment. The vaginal-portion in this state easily bleeds under examination, under coitus, and under any exertion or emotion. Leucorrhœa is generally copious. Lumbar pain is constant. General prostration certainly attends. Some degree of prolapsus is rarely absent.

A similar state exists throughout the cervical canal. The rugæ are prominent, bared at least in part. The surface is bathed in viscid, clear, or turbid mucus. The canal is more patulous than usual. Intensely vascular, and the vessels badly protected by delicate new epithelium, which is being shed as fast as formed, the intra-cervical surface easily bleeds, so that metrorrhagia is common. All this can be easily seen through the metroscope, or even in part through the bivalved speculum, whose blades, made to diverge, open the os externum. At this stage the glands on the vaginal-portion, sharing in the local congestion and inflammation, are apt to get obstructed. One may often see them as dark-red nodules shining through the granulations bared of epithelium. These persist often after the surrounding structures have recovered, and may become the foci of fresh irritation. They may be cured by lightly pricking them.

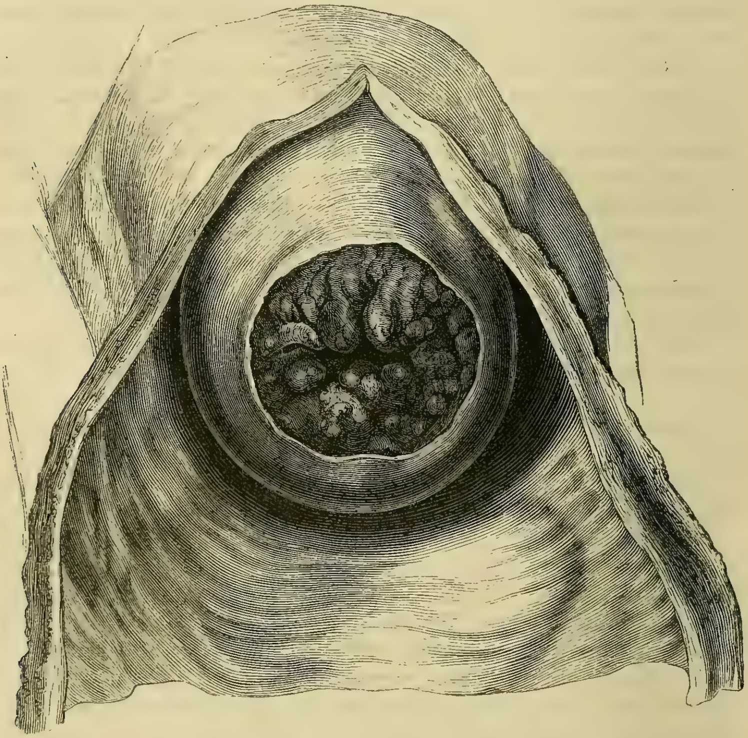

Fig. 101.—(From Nature.)

SHOWS CONDITION OFTEN OBSERVED A MONTH AFTER LABOUR. CONGESTION OF VAGINAL-PORTION. EPITHELIAL DENUDATION AROUND THE OS (R. B.).

Some of these objective conditions are fairly illustrated in Fig. 101, drawn from Nature from a case observed about a month after labour. This drawing shows also the enlarged relaxed state of the fundus of the vagina which attends this stage of the affection. The microscopical condition of such a case is represented in Fig. 102.

By some this condition is called "*inflammation;*" and the state of the os uteri, bared of epithelium, is called "*ulceration.*" In some cases, undoubtedly, inflammation intervenes; and the question of ulceration is one of doctrine. What is ulceration?

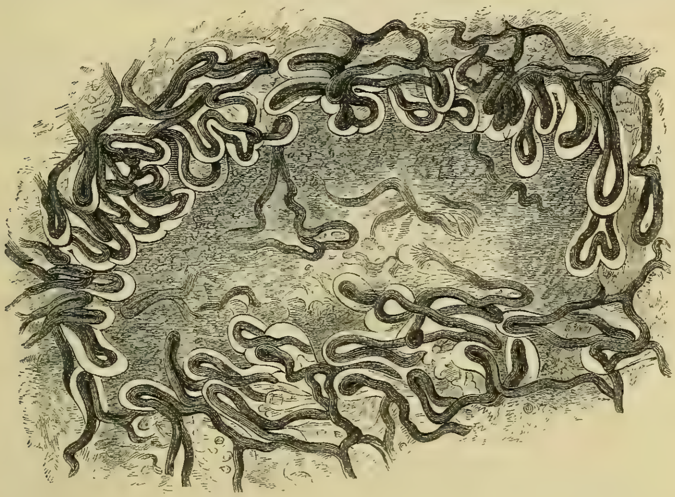

FIG. 102.—(AFTER HASSALL AND TYLER SMITH.)

SHOWING LOSS OF EPITHELIUM, LEAVING VILLI OF OS UTERI BARE, AND PARTIALLY ERODED.

If we consult the most recent authorities for an explanation, we find Simon (Holmes' *System of Surgery*) defining ulceration as a destructive process of inflammation: "It is the process by which holes are made through the surface-textures of the body (cutaneous, mucous, articular, or serous), and hence perhaps into deeper parts; a process which differs from gangrene mainly in the fact that it proceeds more gradually and molecularly. At the place where an ulcer exists, the absent texture perished as truly as by grangrene; but while grangrene would have occasioned its abrupt separation in mass, ulceration permitted its progressively shedding as detritus. The discharge from any spreading ulcer, if examined under the microscope, invariably exhibits particles of disintegrating tissue; and the so-called foulness is but gangrene on a smaller scale."

Macleod (Cooper's *Surg. Dict.*, 1872) gives a similar explanation. He says, "Ulceration is a result of inflammation, and consists in the molecular death and removal by minute disintegration and solution of the superficial vascular particles of the inflamed part. There is a minute atomic division of the particles of the affected tissue, and these molecules are removed in the 'ichor' or discharge which escapes from the surface of the sore or 'ulcer' which forms. The terms desquamation, or excoriation, or abrasion, are applied to the removal of epithelium alone, while ulceration implies a deeper penetration of the destructive action."

If we next examine what is meant by inflammation, we find Simon giving the following account of what takes place in this process:—

"The capillaries allow fluid to sweat through their coats from the liquor sanguinis to the tissues. In this way they minister to growth. If the membrane be ruptured or dissolved, normal transudation is at an end, and capillary hæmorrhage takes place.

"The arteries are more relaxed, carry a profusion of blood. The veins carry more blood than usual; but not all that the arteries carry into the tissues: something is left behind in the tissues."

Now, in the typical case before described, is there not greater relaxation of the arteries? do they not visibly carry more blood? do not the veins carry more blood? and is there not something left behind in the tissues? It is impossible not to answer all these questions in the affirmative. And so of ulceration: is there not gradual shedding of tissue as detritus? does not the discharge exhibit particles of disintegrating tissue? is there not a hole through the mucous surface-texture? Or is this breach of surface the result of gangrene? According to the historical and clinical points of view from which I have regarded the condition, it appears to be a combination of the two processes of gangrene and ulceration. The first step is traumatic; the mucous membrane is really killed by the bruising it underwent, and the partial severance from the deeper textures upon which it grew. Hence it is cast off by a process which cannot be distinguished from gangrene. It is remarkable that the area of epithelial denudation is almost always strictly limited.

There is a more or less indented irregular line of demarcation where the epithelium stops abruptly at a distance of about half an inch from the centre of the os uteri. This line represents accurately the extent of the mucous surface which fell under the crushing of the passage of the head. The fissures very seldom go beyond this line. Nor does the area of denudation tend to spread beyond it. In this respect the case differs from that of surface-ulceration. If there be ulceration it must be by destruction of tissue within this circumscribed area; that is, in depth. Of such action, however, there is usually very little. Probably the eroded appearance of the bared villi accurately, as I know it is, represented in Hassall's drawing

(Fig. 102), is also due, like the casting of the mucous surface, to traumatism and necrosis. I do not think that the destructive process is commonly progressive in depth any more than it is in superficies. The process is essentially and truly one of repair; often, indeed, arrested by the excess of congestion of the part, and by the general blood-degradation of the system. But still it is a rare event for this process of arrested repair to pass into the opposite condition of extending destruction. The hypothesis of ulceration has been favoured by the aspect of the denuded part, which strikingly simulates that of a granulating ulcer on the skin. But the observations and figures of Dr. Hassall, in Tyler Smith's *Memoir on Leucorrhœa,* conclusively show that the apparent granulations are really the projecting villi jutting out irregularly on the surface, having lost the protecting epithelium which bound down smoothly all surface inequality.

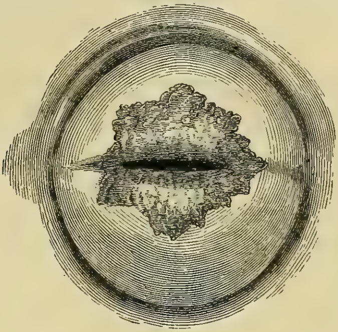

FIG. 103.—(Ad. nat.)

EPITHELIAL ABRASION SEVERAL WEEKS AFTER LABOUR. TENDENCY TO HYPERTROPHY (R. B.).

After all, it may be said, this is a dispute about words. A condition which so closely corresponds to the classical definition of ulceration may fairly be called ulceration. This might be conceded, were it not that the common, vulgar as well as professional, conception of ulceration embraced the idea of a spreading, eroding action; and that thus the word bears a more formidable significance to the patient than the reality justifies. Now, we all know that the morbid surface is not so affected. There is a bared, secreting, easily bleeding surface trying to heal. It is often slow to heal. It may take weeks and months to recover its normal investment of epithelium; but during all this time ulceration cannot be said to go on, otherwise than in the most languid imperceptible form.

But another process is certainly going on. This is exudation. The gorged vessels, through which their contents are only imperfectly propelled, leave something behind in the tissues. "Exudations," says Druitt (Article "Inflammation," Cooper's *Surgical Dictionary*, edition 1872), "cannot remain dormant. They rapidly undergo changes either in the way of development or degeneration." In this case the tendency is towards development. This means hyperplasia and hypertrophy. The connective tissue, or fibrous tissue of the cervix especially, becomes increased in quantity; the cervix becomes after a time denser; it elongates. This latter part of the process, the conversion of exudation into permanent tissue, may be averted by subduing the vascular engorgement, and healing the denuded surface.

The *treatment* of this condition has been described in the preceding chapter. It consists essentially in "rest," tonics, good diet, and local astringents.

If a cure be not effected at this stage, the case will often become more obstinate. The natural tendency to heal can hardly be trusted to if the powers of the system are sensibly reduced. If there be evident anæmia and attendant impairment of nutrition, repair cannot be expected to proceed in a part exposed to constant disturbances, and periodical fluxes of blood. Generally, the vaginal-portion loses in bulk; some degree of contraction takes place, owing to the absorption of the fluid element of the exuded material, and the condensation of the plastic element ensuing upon its conversion into fibrous tissues. The abraded area looks smaller, and, in fact, is smaller, but this is often not so much the result of actual healing, as of the general contraction of the vaginal-portion. (See Fig. 103.) There is still a free secretion of mucus, viscid, coming from the cervical cavity. There is still more or less vascular engorgement, and some infiltration of tissue, with recent exudation. The denuded area looks red, granular, like a strawberry or raspberry. The vagina is still relaxed, and some degree of epithelial shedding goes on from its mucous membrane. The lumbar and dorsal pains persist. There is often pain in the seat of one or other ovary, generally, as Bennet says, in the left.

The *treatment* is still the same as for the earlier stage. The denuded surface should be lightly touched every five or six days with nitrate of silver, or tincture of iodine, and the like application should be made to the interior of the cervical canal. Occasionally the solid sulphate of zinc may be substituted. Vaginal lotions of zinc, alum, bark, or tannin should be used daily. If there be any prolapsus, a Hodge pessary will be of essential service in maintaining "rest," and diminishing the local engorgement.

Under this treatment, the denuded surface will often get covered in in a few weeks, and the excessive vascularity will be reduced. But exudation has taken place; and exudation has been followed by new growth. This hypertrophy, or hyperplasia, even although not attended by much increase of bulk, so as to induce prolapsus, or dragging, or pressure upon surrounding organs, is almost always attended by irritation, which keeps up increased attraction of blood, hypertrophy of the glands, and free leucorrhœa. Pain continues to wear the nervous centres. Healthy nutrition is impeded.

At this stage, the application of potassa cum calce, or the actual cautery to one or the other lip of the os uteri, will often exert the most beneficial influence. The mode of applying these agents will be described under the treatment of chronic metritis.

The further history of hypertrophy, or fibroid degeneration of the cervix uteri, will be traced in connexion with that of prolapsus.

CHAPTER XIX.

CONDITIONS MARKED BY ALTERED VASCULARITY OR BLOOD-SUPPLY: FLUXION; HYPERÆMIA; CONGESTION; INFLAMMATION; METRITIS; ENDOMETRITIS OR UTERINE CATARRH; TUBERCULAR AND SYPHILITIC ENDOMETRITIS; INTRA-UTERINE MEDICATION; CYSTIC ENDOMETRITIS; SOFTENING AND INDURATION OF UTERUS; SENILE CATARRH.

THE vascular system of the genital organs and the proportion of blood supplied may be in excess or deficiency.

The conditions characterized by excess may be distinguished as—1. *Fluxion or simple determination of blood.* 2. *Hyperæmia.* 3. *Congestion or Engorgement.* 4. *Inflammation.* The conditions characterized by deficiency are summed up in *Anæmia.*

Whilst fluxion, hyperæmia, or congestion may each stop short, inflammation implies the previous existence of fluxion and congestion. It may be regarded as the climax of the first three conditions.

1. *Fluxion* in its simplest form may be defined as a transitory flow of blood to the parts. One example of it may be compared to the rush observed in the cheeks under the emotions of shame or anger. The uterus and ovaries are certainly subject to similar determinations of blood under the influence of various emotions, as the sexual passion, and of reflex irritation, as that produced by the child sucking at the breast. This fluxion is of course perfectly physiological; and, if occurring in healthy organs, entails no ill effects, unless it be artificially and inordinately stimulated.

An example of simple fluxion is the physiological determination of blood excited by ovulation at the menstrual periods.

The vascular fulness determined by the developmental attraction of pregnancy may be regarded as an example of fluxion. Analogous to this is the fulness dependent upon the abnormal developmental attraction produced by the growth of fibroid tumours in the uterus. One difference which exists in the two cases, is that in the first, the fluxion is more uniformly persistent, less disturbed by the periodical molimen of ovulation; it is a steadily maintained active hyperæmia. In the second, the persistent hyperæmia induced by the developmental stimulus is further liable to the periodical molimen of ovulation. Hence the tendency, where fibroid tumours, polypi, or cancer exist, to metrorrhagia.

Fluxion has its pathological as well as its physiological significance. Using the term in this relation, it takes the place of those states commonly described as "active hyperæmia" and "active congestion." As Billroth observes,* the vessels dilate or suffer themselves to be distended, under the influence of some irritation, and then quickly disgorge themselves when the irritation has ceased. It may be difficult to discover the true cause, but it is generally easy to observe the phenomenon. The exaggerated afflux of blood is the reaction or the response of a vascularized part excited to irritation: "*ubi stimulus ibi fluxus.*"

If the ovaries and uterus be in an abnormal condition, whether from congestion, inflammation, displacement, from being the seat of new formations, their liability to fluxes is increased. The diseased organs will commonly be even more susceptible than the healthy to irritations which provoke the afflux of blood.

If the uterus be imperfectly involved after pregnancy, or engorged, or its tissues relaxed from other causes, this fluxion, otherwise harmless, may give rise to hæmorrhages. And it is probable that the hæmorrhages so arising act in some cases as an evacuant, saving the uterus from passing into congestion or inflammation.

Fluxion, then, may occur in healthy organs and in diseased organs. Therefore, when studying the pathology of the ovaries and uterus, we must bear in mind not only their actual or essential morbid conditions, but also the influence, beneficial or injurious, of accesses of fluxion to which they are liable. Fluxion is naturally a more frequent complication during the period of active sexual life. But even after the menopause, fluxions at uncertain times may recur. These fluxions, in fact, form a most important element in the history of uterine and ovarian diseases. They are the immediate occasion of some of the most distressing and dangerous phenomena. By being prepared for them, by moderating their intensity, or by preventing their recurrence, we shall often accomplish the most useful therapeutical results.

It may be doubted whether simple physiological fluxion, howsoever frequently repeated, will often produce inflammation of the uterus, ovaries, or their investing peritoneum. It is true that peritonitis and oophoritis are common in prostitutes, and that these events are attributable to sexual excesses. But it is certain that in many of these cases the determining cause has been the propagation of gonorrhœal inflammation, or exposure to cold or other form of violence.

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* "Éléments de Pathologie Chirurgicale Générale," 1868.

The chief *symptoms of simple fluxion are subjective.* The patient feels a sensation of local heat and fulness, depending upon the turgidity of the organs affected, and the tension of the plexuses and erectile portions of the vascular system.

The fluxion may subside as quickly as it arose; and it mostly leaves the organs exactly in their previous condition, unless they were diseased; in which case the fluxion, especially if often repeated, may produce injurious consequences. Should varicose veins exist in the legs, thighs, or groins, the effect of fluxion is seen in a marked manner at the menstrual periods. The veins visibly swell, become tumid, deeper-coloured. The patient is conscious of the increased turgidity. Sometimes the vessels are relieved by œdematous transudation. In this periodical œdema, which I have often observed, we may see a natural provision for relief of high vascular tension.

When fluxion occurs in morbid structures, the symptoms are commonly more severe. Pain is more marked; the sense of fulness, of weight, is more oppressive; dragging pain is felt in the loins and groins; and often, sharp colic spasms in the stomach in the region of the umbilicus. In the more severe cases, and depending somewhat upon the kind and degree of the local morbid condition, the fluxion developes all the symptoms of congestion. The vascular tension seeks relief in discharges; these present themselves as hæmorrhage, leucorrhœal or mucous discharges, and escape from the mucous membrane of the uterus, vagina, bladder, or rectum. These are sometimes accompanied by dysenteric and dysuric pains.

Certain general symptoms precede and attend the local phenomena. The premonitory signs may be defined as an exaggeration of those which mark the approach of the ordinary menstrual molimen. There is a state of tension marked by a chill or even by a rigor, by spasm, vague nervous phenomena, irritability or depression of temper, restlessness, perhaps hysteria.

The attendant signs are the reactionary phenomena which reveal the participation of the organism in the distress of the ovaries and uterus. There is an exasperation of the nervous erethism, with circumscribed pains in certain parts, neuralgia, gastric disturbance, headaches; and, lastly, when the fluxion is often repeated, or has continued an unusual time, there occur what seem to be blood-determinations to the head and lungs.

The *objective signs* are: distension of the hypogastrium, increase of heat, and slight development of pain on pressure. The vagina is relaxed, perhaps secreting mucus; the uterus is increased in bulk, lower in the pelvis, and is tender to the touch. The variation of volume observed in the uterus is at times very great. For example, in a case of anteversion I have felt the uterus, at the time of the menstrual fluxion, assume twice its usual size, and return to its ordinary bulk as the fluxion subsided. The neck of the uterus feels softer, swollen. For the time the mucous membrane of the uterus and vagina is of a deep-red colour.

Courty describes a *chronic fluxion.* But it appears to me that the essence of the idea of fluxion is an active transitory flow. When the vascular tension of a part becomes permanent, there is either hyperæmia or congestion.

The *treatment* of fluxion will, of course, be determined by the degree of the affection, and by the condition of the organs to which the fluxion is determined. Even the ordinary physiological fluxion of the menstrual period requires some management, for influences, otherwise harmless or even beneficial, may, as is well known, act at this time injuriously. The treatment consists in the observance of hygienic precautions, and these may be almost summed up in the one word, "Rest." During this time no operation that can be safely postponed should be performed.

The treatment of fluxion in diseased organs resolves itself in part in the special treatment adapted to relieve the disease. But the fluxion itself demands special management. The periodical fluxions of menstruation we ought to be prepared for. "Rest" here is even more important than in the simple fluxion. But the irregular fluxions, provoked by accidental emotional and local irritations, cannot always be foreseen or guarded against. Familiarity with the idiosyncrasy and surroundings of the patient, however, will often enable us to avert some of these irritations.

We have the indication of one natural mode of relief of fluxion in the hæmorrhage of menstruation; and of another in the quiet subsidence of the local vascular excitement. If the fluxion occur at a menstrual epoch it will be pretty sure to seek relief in hæmorrhage by an exaggeration of the normal menstrual flow. It will rarely be necessary to take measures to excite or to increase the flow. It will more often be necessary to moderate it; for it is one of the remarkable phenomena of hæmorrhage that when once begun, fluxion is determined with increased force towards the organ whence blood finds a ready escape. The bleeding organ seems to acquire the faculty of attracting more blood from the aorta, only to pour it out of the system. The heart becomes excited, and acts with greater force and frequency. The chain of the circulation is broken. The blood escapes at the capillaries instead of being carried on to the veins; and in some cases, perhaps many, there is reason to believe that the raptus towards the accidental outlet is so active that blood is even drawn towards it in a retrograde course from the veins. These phenomena are nowhere so well marked or so easily observed as in the hæmorrhage of the gravid, puerperal and diseased uterus. The treatment of hæmorrhage is considered elsewhere. Our only point here is how to manage the fluxion. There is one very effective agent in turning away the fluxion from the organ predestined to be its seat, which it is almost hopeless to recommend at the present time. The doctrine of *revulsion* teaches that we may divert the torrent of the circulation from an organ towards which irritation conducts it, by setting up an artificial fluxion to another part. This is most certainly effected by venesection. This principle of controlling the circulation was, perhaps is, in great repute on the Continent. I have frequently seen it most beneficially acted upon by Lisfranc. A small bleeding from the arm, timely practised, may not only save a greater effusion, by turning aside the current from the morbid surface, but by lessening the vascular activity in the diseased organ, may check the progress of the disease.

The condition of usefulness from bleeding depends upon the observance of the principle of revulsion. The bleeding must be practised at a distance from the organ we want to relieve. It need not be large in amount. A few ounces drawn from the arm by venesection or from the temples or nucha by leeches, will commonly suffice. It should, however, be remembered that all fluxions are not alike benefited by this treatment. It is especially useful in young plethoric persons; and when the fluxion is recent or only impending. It is also useful in some cases of more languid fluxion in women labouring under hepatic difficulty, or heart disease disposing to portal obstruction.

Another form of revulsive treatment, less powerful, and more likely to commend itself to current ideas, consists in causing derivation to the skin or intestinal canal. By epispastics, by blisters, or fomentations, we can excite some degree of local afflux to a distant part of the body. By purgatives we can cause a derivation to the intestines, and take off some degree of vascular tension, by drawing off a portion of the watery element of the blood.

A revulsive recommended by Hippocrates, is the application of dry-cupping to the breasts. The illustrious father of medicine well knew the sympathy which existed between the breasts and the ovaries and uterus. This idea has in recent times been applied by the Germans and the late Dr. Rigby, to excite the uterus to contract after labour, and by Scanzoni, who sought to provoke labour by thus stimulating the breasts. Courty speaks highly of the efficacy of dry-cupping the breasts to obtain the revulsive effect we are discussing. I am able to give a qualified approval to the practice of Rigby. That of Scanzoni has been condemned by the results of observation. The irritation of the breasts, whilst not always fulfilling the purposes in view, not seldom caused inflammation and abscess. I should fear similar accidents from Courty's practice, especially as he insists that the method, to be useful, must be kept up for several hours, even days. It is further open to the objection that irritation of the breasts is likely to excite fluxion to the uterus, and thus to cause the very accident it is sought to avert. Again, it is not desirable, for obvious reasons, to irritate the breasts in young women.

Certain medicines possess the valuable property of allaying and regulating vascular excitation. Of these the most useful are the acetate of ammonia, nitrate of potash, tartarated antimony, aconite, digitalis, veratrum, salicylic acid.

A very useful formula is — ℞ Liquoris ammoniæ acetatis, ʒ iij; nitratis potassæ, gr. xv.; vini antimonialis, ♏ xv.; infusi digitalis, ʒ ij.; aquæ, ℥ j. M. This dose may be taken every three or four hours. It determines to the skin and intestinal canal; it may possibly provoke nausea or vomiting, but this has a powerful influence in checking hæmorrhage.

2. *Hyperœmia* must, I think, be distinguished from fluxion on the one hand, and from congestion on the other. It is a continuous or chronic fulness of the vessels of a part which does not necessarily imply morbid action in that part, but which at most leads to languid, passive changes.

Hyperæmia occurs especially in connexion with excessive menstrual congestion; the uterus is full of blood, dark-red, swollen, softened; the mucous membrane is injected, red, swollen, with a spongy flocculent aspect from the development of its uterine tubular glands, softened and bleeding.

The development of the uterine glands is at times quite extraordinary. Rokitansky saw in the body of a girl, who died in course of typhus whilst menstruating, the mucous membrane, especially on the posterior uterine wall, dark-red, and converted into a thick stratum of villous-looking folds packed together, in which the uterine glands were elongated to 6‴ or more. I have specimens of dysmenorrhœal decidua showing the same thing.

In the course of typhus, cholera, typhoid, the exanthemata, scurvy, hyperæmia of the uterine mucous membrane occurs.

The uterus becomes hyperæmic and swollen when the pelvic system of veins is overloaded, and especially when flexions or displacements of the organ exist. In the latter cases, the hyperæmia is most marked in the anterior or posterior wall.

New formations cause and keep up hyperæmia, sometimes more marked in the uterine substance, sometimes in the mucous membrane. It also occurs in heart disease, in obstructions to the return of blood through the vena cava. Often, it principally affects the lower segment of the cervix and the vaginal-portion.

Persisting hyperæmia leads to persistent secretion of mucus, and to hypertrophy of the uterus, commonly of the eccentric form; to hypertrophy of the vaginal-portion, with predominance of the connective tissue; and thence to induration, the so-called *infarctus.* Hyperæmia disposes to œdema of the tissues and to hæmorrhage. The hæmorrhage takes place from the mucous membrane into the uterine cavity as the expression of the hyperæmia. The outpoured blood flows away, or sometimes, even without marked obstruction of the canal, forms clots, or one, which compressed takes the form of the uterine cavity.

There is often a chronic pelvic hyperæmia in aged women, leading to hæmorrhage. The hyperæmia is mostly due to portal obstruction and to the general want of vascular tone arising from obesity and want of exercise. This state may induce softening, fragility of the uterine substance, and fragility of its vessels.

Its seat is the fundus, and especially, almost exclusively, says Rokitansky, the posterior wall. The soft uterine substance looks black-red, infiltrated with blood so as not to be recognizable, and blood is seen in variable quantity in the tissues when section or rent is made. The mucous membrane is commonly in the same condition; and often blood is found in the uterine cavity (the apoplexia uteri of Cruveilhier).

If the vaginal-portion be examined by the speculum it is seen to be swollen, dark-red, and the whole vagina commonly exhibits the same appearance. There is a sense of weight and heat; often some degree of prolapsus; and also a troublesome form of pruritus.

Considerable improvement sometimes follows a spontaneous hæmorrhage; and hyperæmia being essentially a passive condition due to superior obstruction, a few leeches applied to the os uteri will occasionally be serviceable. But our chief effort should be directed to correcting the condition of the central organs of circulation and digestion, to restoring the general health, and to removing any uterine complication.

3. *Congestion or engorgement* of the uterus and ovaries. This condition implies a more prolonged fulness of the vessels than mere fluxion; it rarely exists without some amount of retardation of the blood in the vessels, that is, hyperæmia; and this retardation almost certainly entails more or less effusion of the serous or aqueous elements of the blood into the tissues of the organs affected. This implies swelling or tumefaction. Once set up, this condition is extremely liable to persist. The frequently dependent position of the organs favours the accumulation of blood in them, whilst their liability to fluxes, under

the influences already mentioned, is a constant source of aggravation and impediment to cure.

Congestion may arise from many causes. If the organs are caught whilst under the influence of physiological fluxion by constitutional shock, by exposure to cold, or protracted fatigue, fluxion may pass into congestion.

Congestion of the uterus very frequently takes its rise in the state of imperfect contraction and involution following pregnancy and labour. The relaxed tissues and dilated vessels form a ready receptacle for the blood, and the want of tone and contractility obviously favours its retention.

Whatever the cause of congestion, it is soon aggravated by displacement of the womb. Implying, as congestion does, increased bulk and weight, and attended, as it almost necessarily is, by relaxation of the structures which ought to support the womb, this organ almost invariably sinks lower in the pelvis, or its body falls backwards or forwards.

The effect of displacement is almost surely to add to the congestion, or to induce it. Take, for example, the case of anteversion or retroversion. Under the repeated rushes of ovulation, of sexual relations and other causes, congestion is brought about by the obstruction which the displacement interposes to the return of blood. The body of the uterus rolled over on its transverse axis in the broad ligaments, twists, distorts, and compresses the vessels at the point of entry and exit. Blood still enters the uterus by virtue of the propelling *vis à tergo* through the arteries; but the veins, thin-walled, flaccid and valveless, rendered tortuous and compressed, afford but a difficult return. This state gives rise to what French authors distinguish as *engorgement*, but which it seems more convenient to describe as a phase or consequence of congestion. It is difficult to imagine that pure congestion can long exist without giving rise to the infiltration of tissue which constitutes engorgement.

Uterine congestion complicates, or plays an important part in, a large proportion of cases of uterine disease. It constitutes one of the most serious obstacles to their cure. It tends, by its very conditions, to perpetuate itself. It exhibits little or no tendency towards spontaneous recovery. The organ in which it occurs is rendered permanently larger, its tissues are infiltrated with serum or semi-plastic extravasations, its contractile force, the tonicity of its vessels are impaired; the blood brought to the uterus, either by the ordinary distribution or by intermittent fluxions, is delayed; a kind of hæmostasis is induced; and these conditions are aggravated by time, by the increasing mechanical impediment to the course of the pelvic circulation, which displacement of the uterus in relation to the broad ligaments induces.

Uterine congestion may be *primary*, and for an indefinite time constitute the chief morbid condition. It rarely exists long without inducing displacement, as prolapsus of the uterus; and sooner or later, it is likely to lead to other evils, as hypertrophy and inflammation.

It may be *secondary* upon other conditions. There is one which in my experience almost infallibly induces congestion. That is the fixing of the womb; whether this be from perimetric adhesions, from compression of tumours, from pressure against the symphysis pubis by retro-uterine hæmatocele, or other cause. But the most frequent cause is retroflexion with locking of the fundus beneath the sacral promontory.

The *symptoms of congestion* are essentially the same as those which mark the combination of fluxion and hyperæmia; the diagnostic test being the persistence of the symptoms, and the accidental intermittent character of the fluxions which may or may not complicate this congestion. There is also more pain than in hyperæmia. The enlarged uterus, by its proximity to the bladder and rectum, irritates these organs, keeps up hyperæmia in the surrounding pelvic tissues. The reflex excitation, or the proximate irritation, causes frequent desire to void urine, and dysuria; the same causes may induce dyschezia, tenesmus, straining, at times diarrhœa. Expulsive efforts are caused, at first involuntary, afterwards perhaps intensified by the semi-involuntary bearing-down, excited by the sensation that there is something to be expelled. The contraction of the abdominal walls, as in the act of defæcation, of sneezing, of coughing, is attended by indirect pelvic pain, more or less acute.

A frequent consequence of congestion is dysmenorrhœa. This symptom, when not accounted for by obstruction from stenosis or angulation of the uterine canal, is, I believe, most commonly due to the accumulation of blood in the uterine cavity, its coagulation there, and retention, which is favoured by the quantity poured out. It has time to clot, partly because its quantity is in excess of the mucus which helps to keep it fluid, and partly because it is allowed to rest by the uterus, whose power of contraction is enfeebled by the congestion. Retention means irritation, and irritation means uterine colic, that is, dysmenorrhœa. This symptom is the more certain to follow in proportion to the degree of displacement of the uterus.

The difficulty which congestion occasions to the uterus in the performance of its functions becomes a source of aggravation of the congestion. It not uncommonly happens that the menstrual function is disordered in its periodicity, as well as in its other characters. The patient often becomes irregular, sometimes she even loses the reckoning so as no longer to know when her periods are due. The menstrual flow is merged in hæmorrhage. It may last for a week or a fortnight, leaving a fortnight or three weeks interval only; or a flow of blood, which it becomes difficult to distinguish as menstrual, appears at irregular intervals. Not seldom, however, the menstrual discharge becomes scanty, or ceases to be noted otherwise than doubtfully in the shape of irregular discharges of blood.

Leucorrhœa is an almost constant effect of congestion; the gorged vessels of the uterus seek relief by secretion of mucus; and Rokitansky has shown that the glands, under hyperæmia and congestion, undergo enormous development.

The *local signs* are the increased bulk and weight of the organ, involving diminished mobility, and more or less displacement expressed by prolapsus and retroversion or flexion, or anteversion. By the speculum the vaginal-portion is seen swollen, deep red. The vaginal-portion and cervical cavity easily bleed on examination by touch, speculum, or sound.

Congestion is often more or less limited to the vaginal-portion when there is stenosis of the os uteri externum. This condition is discussed under the head of "Dysmenorrhœa." Congestion of the vaginal-portion also occurs in prolapse with hypertrophy of the vaginal-portion. In this condition the vaginal-portion is liable to get constricted by the circular compression of the vagina, and between the bowel and bladder. This constriction retards the circulation in the lowest part of the vaginal-portion, makes it tumid, and increases the disposition to hypertrophy. This is exemplified in a figure from a preparation in King's College Museum. (See Prolapsus: hypertrophy.)

Congestion may affect the whole uterus; or it may affect the body or the cervix only. The congestion bears most obviously on the mucous membrane.

The treatment of congestion and engorgement must be determined greatly, in most instances primarily, by the indications for the removal of the complicating conditions. Thus, attending prolapsus, version, or flexion, demands special care. The displacement corrected, the associated congestion will almost certainly be relieved, if not removed. The management of the complications is described where they are treated of as primary or essential disorders.

It is necessary to remember that congestion or engorgement of the uterus is curable, whilst old-standing hypertrophy is not.

Again, many women who have passed the climacteric, scarcely need to be treated for congestion. This condition, when existing, is no longer so liable to exacerbation by fluxions; it becomes more passive; the pain subsides; and tolerance is acquired. But, on the other hand, youth is favourable to cure; the activity of the circulation and of all the functions facilitates the absorption of effused matters; and the very functions of the uterus, as menstruation and pregnancy, by virtue of the retrograde involution which seizes upon the uterus when these functions are completed, may involve the morbid hyperplastic structures, and thus dissolve them. A remarkable example of this process is seen in the occasional diminution or even disappearance of fibroid tumours after labour.

The question of local depletion when there is congestion is important. Its action is powerful, and resort to it requires discretion both as to the selection of the cases and the method to be employed. If the congestion is liable to periodical aggravation, especially if attended by hæmorrhages, from menstrual fluxion, the principle of derivation and revulsion already discussed, should be invoked. Where the congestion is accompanied by intense pain and sense of weight, the bulk of the uterus being sensibly increased, benefit will sometimes be derived from local depletion. This may be practised either by leeching or scarification. *Leeching* has been extensively employed in the treatment of uterine disease; and if one may be permitted to judge from the observation of cases where it has failed to do good, or has done harm, under the advice of other practitioners, I should say that it is employed much too often. The effect of the suction of leeches on the lower segment of the uterus is often to attract blood to the pelvic organs. The free anastomoses of the branches of the internal iliac, the numerous plexiform structures, the numerous valveless veins constitute a peculiar formation unfavourable to local bleeding by exhaustion. The vascular system of the pelvis has been likened, not inaptly, to a sponge. Draw blood from any one part, and it is immediately replaced by a new supply; the vessels can hardly be emptied; you may attract any quantity of blood through this channel, producing marked systemic effect, but the local engorgement may be little diminished. That this is often the effect of leeching the os uteri and upper part of the vagina I am very confident; and, therefore, I now resort to this practice with very great circumspection.

The method of *scarification* is not open to the same objection, at least not to nearly the same extent. Superficial scratches or incisions made on the vaginal-portion will give vent to the blood gorging the part operated upon, without entailing a fresh fluxion to the organ. The most marked benefit from incisions in the vaginal-portion, is often seen when the os externum is divided on account of stenosis and dysmenorrhœa. In this condition the mucous membrane is often intensely gorged; and when cut, it is left pale and less swollen by the very moderate loss of blood which attends the operation.

The *mode of applying leeches to the cervix uteri* is to introduce a Fergusson's or other tubular speculum, bringing the cervix well into the field; to wipe off any secretion with a bit of cotton wool or sponge; then to put the leeches, three or four in number, into the speculum, and push them down upon the cervix by a pledget of cotton-wool. The operation is often troublesome, and this is another objection to it. The leeches at times refuse to bite, and worm their way out most insidiously between the wool plug and the speculum, and easily escape altogether unless carefully watched. Leeches have even got into the uterine cavity, and have thus caused acute metritis and hæmorrhage. For this opium is the best treatment. In the event of excessive bleeding from the bites, it is generally enough to expose the bite and to apply a small compress soaked in perchloride of iron. If bleeding break out afterwards, the same course is still the best. Get at the wound and apply the styptic to it direct. As a temporizing measure we may sometimes apply one plug soaked in a strong solution of alum, and then pack the vagina with a succession of other plugs lubricated with vaseline or carbolic acid oil. One leech at a time may be more conveniently applied by means of a long glass tube open at the uterine end, and provided with a piston to push the leech onwards. In London there are several nurses who take charge of this little operation for a moderate fee.

Scarification is to be preferred to leeching for the reasons assigned, and also because it is more convenient to carry out. The operation is performed through a speculum. The most convenient is my "crescent speculum." It brings the os uteri nearer to the outlet, exposes it more freely and under greater tension, than the tubular speculum. Almost any bistoury long enough, may be used, but it is most convenient to employ a scarificator designed on the model of Syme's knife. It is carried by a forceps and kept fast by two pins which go through the forceps. It gives stabs into the vaginal-portion rather less than half an inch deep. The number and depth of the stabs will be determined by the nature of the case, and the flow which follows the first one or two punctures.

Inflammation.—What is called *endometritis* or *uterine catarrh*, meaning, more or less precisely, inflammation of the mucous membrane of the uterus, is the form of metritis the most frequently met with, and that presumedly as a distinct disease. It might on this ground be considered desirable to describe it separately. But regarding the frequency of its complication with inflammation of the parenchyma, either in its origin or in its course, it appears to me on the whole more useful to study metritis and endometritis together. In discussing the treatment, it will not be difficult to point out the modifications which the predominance of one or the other form may especially indicate.

Metritis may be analyzed as follows. 1. There is the *puerperal metritis* springing from convection of foul matter in the venous and lymphatic channels, from the cavity of the uterus. This usually runs a rapid course, and when fatal, it is rather by general infection of the circulation and peritonitis, than from the simple metritis.

This puerperal metritis may be: *a*, general, or *b*, limited more or less to that portion of the uterine wall which corresponds with the attachment of the placenta.

Both forms are likely to be attended by peritonitis. Both may become chronic. In either case, the due involution will be retarded, and the uterus will remain larger than normal.

2. Very *similar conditions* may follow in the non-pregnant state, from the slow necrotic inflammation to which polypi and fibrous tumours are prone; from necrotic or inflammatory changes in cancerous growths; from peculiar fungoid or other morbid conditions of the uterine mucous membrane.

3. We are, perhaps, most familiar with *acute metritis*, apart from the puerperal state, as the result *of injury or irritation produced by surgical treatment.* Thus, operations upon the uterus, as incision of the cervix; scraping, or cutting, or tearing away of fibroid tumours; the application of caustics to the interior of the uterus, especially in the form of injections; the use of tents, laminaria or sponge; and above all the wearing intra-uterine pessaries, may induce metritis. In all these cases there may be absorption of foul matter by the vessels which permeate the walls of the uterus.

In all these cases, the inflammation mostly invades all the tissues of the uterus, mucous, muscular, vascular, and peritoneal, and almost invariably spreads to the cellular tissue on either side of the neck, involving the broad ligaments. Generally, the extra-uterine inflammation predominates over the metritis proper.

Metritis may be simple or complicated. The inflammatory complications are: inflammation of the ovary, of the tubes, of the perimetric cellular tissue, of the pelvic peritoneum, perimetric phlegmons or abscesses, lymphangitis, phlebitis, phlegmasia dolens. All these complications, or some of them, may arise not only as consequences of labour, but also from suppressed menstruation, cold, local injury, conditions arising out of uterine tumours, or of tubercular or cancerous disease.

Dr. West has described as "metritis hæmorrhagica" the intense acute inflammation which occurs when a piece of nitrate of silver falls into the cavity of the uterus. In such a case, free hæmorrhage is very apt to arise.

The difference of structure and of function of the cervical portion of the uterus confers upon it pathological liabilities distinct from those of the body of the organ. It may be true that by continuity of tissue, and by receiving its blood supply in great part from the same vascular system, inflammation of the cervix is apt to spread to the body, and *vice versâ;* but practically, we often have to deal with cases in which one or the other part is so much more profoundly affected than the other that it demands special attention.

This consideration, and the advantage of avoiding much repetition, have led me to curtail in this place the description of inflammation of the cervical portion. The complement of this subject will be found in the section devoted to the changes consequent on labour, and in that on prolapsus and hypertrophy.

INFLAMMATION OF THE SUBSTANCE OF THE UTERUS: METRITIS.

The inflammation of the submucous stratum which occurs in *acute endometritis* spreads sometimes to the whole uterine substance, and rises to such a height that the uterus swells to the size of a goose's egg, becomes softened, reddened, unusually succulent and infiltrated with small extravasations. This acute metritis next invades the peritoneal covering of the uterus and of the neighbouring organs. In some rare cases the issue has been in suppuration, and the formation of abscesses in the walls of the uterus, which like the puerperal abscesses, lead to various secondary destructive actions.

Chronic metritis proceeds from the acute form, or is developed out of persistent hyperæmia. It not uncommonly arises slowly, even insidiously, out of irritation produced by other morbid conditions, as tumours or cancer; and that without being preceded by any condition that can rightly be called acute inflammation. It leads to hypertrophy of the uterus, with preponderance of the connective tissue, which affects the whole organ or prevails in the body, cervix, or vaginal-portion. Its most frequent foundation is undoubtedly laid in retarded involution after labour. Much, therefore, of what might, in strict order, be discussed in this place, has been anticipated in the chapter on the consequences of labour; and which should, therefore, be read in connexion with the description of metritis.

Chronic metritis thus takes its rise in hyperæmia. Whatever produces retardation and accumulation in the uterus or in the utero-ovarian system of vessels, leads to chronic metritis. Scanzoni* says the influence of heart disease in producing chronic metritis is under-estimated. Stenosis and insufficiency of the mitral valves, by inducing retrograde venous stagnation, causes hyperæmia of the uterus. He also insists that chlorosis and other forms of anæmia, by favouring pelvic hyperæmia, frequently lead to chronic metritis.

Scanzoni has distinguished two stages of metritis: namely, 1, a stage of *infiltration* or *softening*, in which is observed more or less extensive hyperæmia, a sero-sanguinolent infiltration of the uterine tissue, which in consequence becomes soft, relaxed, thickened; and 2, a stage of *thickening or induration,* in which general or partial anæmia of the organ, dryness, firmness, and hardness of tissue are the principal lesions.

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* "Die Chronische Metritis," 1863.

In the first stage, that of softening and hyperæmia, there may be excess or alteration in the secretions of the mucous follicles; especially, new formations may arise, or there may be general hypertrophy of the organ. In this stage the softened uterus is flaccid, so that it can be bent backwards or forwards, and pressure of the finger leaves a depression. The surface of the organ often exhibits stringy peritoneal adhesions to the neighbouring structures. When a section is made with a scalpel, there is absence of that creaking sound which is heard when the healthy dense tissue is cut through. It is like cutting through an ordinary muscle. Fluid blood flows from the cut vessels, and serum from the tissue. The cut vessels are seen of larger calibre, gaping in places, but not universally. In intervening spaces the vessels may, to the naked eye, show no alteration. The parenchyma itself has lost something of its resistance; it is more succulent and friable. The increase in thickness of the wall at this stage, Scanzoni says, is not demonstrably due to increase of muscular fibre, but mainly to the serous infiltration. It is more swelling than new growth. He has also observed advanced fatty metamorphosis of the muscular-bundles, and in the interposed connective tissue a great number of free fat-globules. This more especially applies to the upper part of the organ. The mucous membrane is almost invariably the seat of chronic catarrh.

In the second stage, that of thickening or induration, there is a general or partial anæmia of the organ. The tissue is dry, tough, and hard. This hardness strikes the observer as the next feature after the increase of volume. The hardness resembles that of dense fibroid tumours. These characters are very clearly seen when the hypertrophied vaginal-portion is amputated. This tissue-change, Scanzoni says, is more evident in the posterior than in the anterior wall, and he attributes this to the fact that the hinder wall is the more frequent seat of the placenta. The indurated places look pale, yellow, or yellowish-red, and this appearance is made more striking in those cases where these places are surrounded by others still in the stage of infiltration, and which will be soft and red. But cases are frequently observed in which the whole organ is thickened and indurated. In the hardened parts the vessels are contracted. The chief contribution to the increase of volume of the tissue is made by excessive growth of the connective tissue, although the muscular element may to some extent contribute. As far as I can trust my own observations made upon the hypertrophied vaginal-portion after amputation, I must concur in this statement. The same operation also gives evidence of the contraction of the vessels. Incision made with the knife divides no large vessels; there is at most an oozing from the surface. The greatest part of the blood comes from the divided mucous membrane.

Chronic metritis, although it may predominate in the body or cervix, almost invariably affects the entire uterus, more or less. Scanzoni has taken great pains to verify the statements of those pathologists who contend that the anterior or posterior wall or the fundus may be the especial seat of hypertrophy from chronic inflammation. He has occasionally found a part more thickened than the rest; but invariably the entire body of the organ is enlarged. The growth is outwards; it leaves the cavity expanded, impairing more or less its triangular shape, so that it becomes more ovoid. This is in exact conformity with my own observations.

The mucous membrane is swollen, softened; the glandular orifices are prominent, open, visible under water. The gland-tubes themselves are much elongated. Mucus, stained with pus, is generally found in the cavity.

The origin of the increase of bulk undoubtedly, in many cases, lies in acute metritis. The effused fluids not being entirely absorbed, what remains becomes organized. But there are many cases in which it is difficult to prove the existence of inflammation. Under simple hyperæmia fluids are effused into the tissue, and the non-absorbed excess may undergo the same change into dense tissues. It is thus that during long-persistent hyperæmia there may be intercurrent attacks of metritis. But this is not shown to be necessary—the process is one of *disordered nutrition*. Klob denies that the hyperplasia is due to inflammation, and says the origin is in habitual hyperæmia.

The changes produced in the cervix uteri by chronic inflammation involving the whole uterus have been partly described in a preceding chapter. Those which are necessarily dependent upon antecedent pregnancy, are the following:—

The *follicular excoriations of the cervical canal* arise, according to C. Mayer, in the following manner: There is an inflammatory process in the mucous membrane, so that the follicles being involved, their excretory orifices are closed. Then three several pathological changes proceed: 1. The follicles swell gradually to the size of a millet seed, and form round, smooth, elastic cysts containing a delicate, viscid, stringy matter, known as ovula Nabothi. Often the contents assume a purulent condition; and at length the follicles burst, and leave round, follicular ulcerations. 2. The follicles do not reach the above-described development, but stop as it were on the way, as small, roundish bodies with thickened investments, and scanty contents, like hard knots on the surface, and so persist. 3. Or the follicles project more and more out of the mucous membrane, like ovula Nabothi, become bigger, and hang down, stalked, like scarlet-red pearls out of the os uteri. These are called mucous polypi.

These three forms give rise to three distinct forms of follicular erosions and ulcerations, different in their symptoms and in their appearance.

In the first form the os uteri is nearly always large, gaping, its scarred borders everted; its whole surface feels rough, uneven. The profuse secretion is often yellowish, puriform, not seldom mixed with blood, and offensive. The lips are dark-red, even purple, hyperæmic. The prominent smooth follicles are easily recognized; they have a turgescent, often finely granular surface. A thick stream of opaque, yellowish-white secretion flows from the cervix. Where the follicles have burst, roundish ulcers remain. This condition is not limited to the os uteri, it extends to the interior of the cervix.

These follicular affections, C. Mayer says, are almost always associated with chronic metritis. Scanzoni associates them with retarded involution of the uterus. The mucous membrane, with its glandular apparatus, hypertrophied during pregnancy, remain stationary, and give rise to the affections described. That this is in many cases true, I do not doubt. But the explanation I have given in the chapter on the changes the cervix undergoes after labour is, I am equally sure, more generally true. The mucous membrane, at least its epithelial element, falls by a necrotic process; and one does not usually see in the post-puerperal cases distinct rounded follicular ulcers, but a large surface bared of epithelium; the granular aspect being due, not so much to the enlarged follicles, as to the swollen villi no longer bound down by their epithelial investment. (See Fig. 102.) The roundish erosions resulting from burst follicles described by Mayer, are often seen independently of pregnancy, that is, years after the last pregnancy, and even in women who have never had children.

There is another form of erosions described by Scanzoni and others, which ought not to be confounded with the foregoing. These result from *aphthous eruptions.* Partly in the immediate proximity of the os uteri, partly scattered at some distance are small vesicular points as big as a pin's head. The epithelium is easily rubbed off by a brush, leaving a small vivid red spot. Sometimes several of these vesicles run together, and give rise to a large erosion. This kind of erosion is distinguished from the preceding one in the absence of follicular swelling of the cervical mucous membrane, by the thinness of the superficial wall of the vesicle, by the ease with which the vesicles burst; and in their leaving, not a sharp deep ulcer, but a superficial, perhaps irregular, erosion. This appears to be the herpetic, dartrous or eczematous ulceration of Huguier and Courty, terms, which I think Aran rightly finds fault with, since they imply a connexion with herpetic disorders of the skin, of which there is no proof. On the other hand, Scanzoni relates a case of an otherwise healthy woman who suffered from aphthæ of the mouth, who, whenever she had a fresh eruption here, always had attacks of pruritus vulvæ and slight leucorrhœa, attended by vesicular eruption on the mucous membrane of the vaginal-portion. These were speedily cured by light touches with nitrate of silver; but a relapse always followed the formation of aphthæ in the mouth.

The *papillary erosions* I have described under the changes following labour under the name of "villous." I believe they are more frequently the cause than the consequence of chronic metritis. Dating from the act of labour, arising in traumatism, they precede metritis. Although the metritis may, and often does, arise out of the hyperæmia attending retarded involution, yet even in cases where involution has proceeded fairly well, the raw surface left by the fall of the epithelium, keeps up irritation, and attracts an undue flow of blood to the part; maintaining a condition constantly liable to merge into subacute inflammation.

In connexion with chronic metritis, it is not rare to find a form of erosions to which the name of "cock's-comb ulceration" has been given. It appears to be a transition-form from the papillary or villous erosion to the cauliflower-excrescence. When this occurs, the tumefaction and enlargement of the whole cervix as well as of the vaginal-portion are considerable. There is intense hyperæmia, and often some degree of loss of mobility of the lower segment of the uterus. This appears to be due, at least in those cases where evidence of malignant disease is not pronounced, to infiltration of serum, with some inflammatory process in the cellular tissue immediately outside the cervix. These cases are difficult to deal with. Absolute rest is essential. Local applications of chromic or nitric acid answer the most effectually.

Scanzoni, in 1856, described the "*varicose ulcer*" as a form of disease of the cervix uteri arising in this way: Some time after the existence of a marked increase of volume of the uterus, and of a profuse secretion from its cavity, a bluish-red coloration is developed on the vaginal-portion and the adjoining part of the vagina; some dark blue spots gradually appear, upon which, after a time, numerous varicose venous branches become manifest. Upon these spots the mucous membrane softens, and forms elevations recognizable by sight and touch. The epithelium is thrown off, and an erosion is the result. At a further stage the loss of substance extends deeper, usually giving rise to free hæmorrhage. The surface of the sore looks remarkably pulpy, so that the sound easily penetrates it. Scanzoni has only seen these varicose ulcers in women who had borne children, and in whom there had long existed obstruction to the portal circulation, or in the subjects of heart disease. I have, however, notes of a case taken at the London Hospital, in which there was a vascular nævus-like growth on the os uteri of a woman who had never had children. She was said to have had three abortions ; but the cervix and os uteri had the features which I have almost invariably found significant of sterility. This woman had frequent metrorrhagia. Under applications of nitrate of silver the varicose mass disappeared, and the hæmorrhage ceased.

Chronic metritis sometimes brings about a papillary swelling of the mucous membrane of the vagina. This was at one time called "follicular." But since Hassall, Henle, Mandl, Kölliker, and others, have shown that the mucous membrane of the vagina is nearly destitute of glands, the papillary nature of the affection has been recognized. It is generally attended by a profuse milky or creamy leucorrhœa. This papillary hypertrophy is often observed in the course of pregnancy, which condition must be regarded as its chief cause. After labour it is sometimes so marked as to resemble a papilloma.

The Course of Metritis.—Inflammation, if it does not terminate in resolution, may become chronic, and lead to hypertrophy, or it may tend to softening and liquefaction. This termination is, I believe, not very uncommon in women past the climacteric. In such cases the whole organ is enlarged. It feels flaccid, swollen, pulpy, between the internal and external examining fingers. The body falls either forwards or backwards, or may seem to squat down on the vagina. The sound passes the os internum easily, provided there is no flexion, or when the down-bent body is tilted up. It penetrates usually rather more than two and a-half inches before resistance is encountered ; and the wall of the uterus is so pulpy, that the point might easily penetrate into or through its substance. More or less oozing of blood commonly follows the examination. By the speculum the os externum and vaginal-portion are seen deep purple or dark red ; the mucous membrane is villous-looking, it easily bleeds.

If there be a tubercular element complicating this metritis, recovery is hardly to be expected. It may be doubted whether, even apart from such complication, recovery takes place, if the softening be general or far advanced.

Abscess in the uterine wall is, I believe, rarely seen unless in the puerperal state ; and in this case it does not, unless exceptionally, arise in the parenchyma, but may be traced from the foci formed in the venous tissues or lymphatics, whose walls are first inflamed by the reception of septic matter from the cavity of the uterus. Abscess does not occur readily in purely muscular tissue.

Metritis proper may, however, run on rapidly to the formation of abscess, as in the following case told by Scanzoni. A young woman had violent metritis after suppression of menstruation. The pains were very acute, resisting all treatment for eight days. The sensibility increased, rigors were repeated several times, and suddenly there was developed, above the horizontal portion of the pubes, a tumour the size of a hen's egg, somewhat resisting, and accurately defined. On the twenty-second day of the illness, symptoms of violent and extensive peritonitis set in, and the patient died on the thirty-first day. Dissection proved that the cause of death was the rupture of an abscess, situated in the right and upper part of the uterus, the pus from which had worked through the outer strata of the uterus and its peritoneal investment.

It can hardly be doubted that this case was one of metritis proper passing into abscess. But a case related by Hervez de Chégoin (Soc. de Chirurgie, 1868), in which an abscess was found at the fundus of the uterus quite closed, the size of a uterus at the fifth month of pregnancy, with enormous development of the fleshy fibre, was probably the result of suppuration in a fibro-cystic tumour. This source of fallacy must be borne in mind.

Amongst the consequences of chronic metritis, Scanzoni lays stress upon the frequent implication of the ovaries. Supplied by the same system of vessels, these readily partake in the like hyperæmia, and in the increased action attending the uterine condition. He says ovarian cysts are a frequent complication. They arise out of chronic oophoritis ; probably in this way an ovum may ripen, but owing to the thickened condition of the surrounding stroma the follicle cannot burst, and the fluid cannot escape. Succeeding menstrual periods with attendant hyperæmia cause fresh exudation into the follicular cavity, and so this grows to a cyst. The other forms of cystoid of the ovary are also often found as complications of chronic metritis.

Chronic catarrh of the Fallopian tubes often comes as an extension of the affection of the uterus ; and one of its consequences is adhesion to the ovary. And, either by adhesion or by simple closure of the tube at its abdominal end, the tube may become distended by accumulation, producing dropsy.

The vagina, in the higher grades of the disease, is almost constantly in the state of chronic catarrh, with more or less swelling and relaxation of its tissues. This is especially true of the upper part or fundus of the vagina.

The bladder participates in the disordered circulation of the pelvis, being involved in chronic catarrh, and perhaps thickening of its coats.

The rectum is also, in like manner, liable to chronic catarrh, attended with varicose dilatations of the hæmorrhoidal veins, especially when there is retroversion or retroflexion of the uterus with enlargement.

In various ways the *skin* shows evidence of disordered nutrition. Hebra says the influence which uterine disorder exerts over the origin of skin diseases, especially of the eczemata, is manifested in the fact that all the chronic skin affections in women undergo a marked deterioration, a fresh irritation, during menstruation. Many women, he says, feel a day or two before this process—commonly in the course of the vessels of the extremities—smarting, burning, and twitching, so that by these symptoms they can foretell with certainty the speedy appearance of menstruation.

Hebra also calls attention to the frequency with which women suffering from uterine disorder *lose their hair.* Every one who sees much of these disorders is familiar with this complaint. In not a few cases it is associated with syphilitic complication. But in a great number of cases there is no reason to invoke this explanation. It appears to be induced by the deteriorated nutrition which follows upon chronic uterine disease. It is often cured, the hair-growth being quite restored, when the uterine disease is removed.

The influence on *pigmentation* is often very striking. Independently of the pale, sallow, or dull earthen hue, the result of the circulation of impoverished blood, more or less tainted with unhealthy elements, there are frequently seen on the face, namely, on the forehead, cheeks, or chin, brownish spots or patches of *lentigo* or *chloasma uterinum.* This chloasma is a form of *pityriasis versicolor.* I have seen marked examples on the chest, which underwent striking increase in depth of colour during menstruation. Although in all likelihood due to disordered nutrition of the skin, it is not determined whether the yellowish-brown colour of the epidermic scales depends upon the peculiar fungus developed in this disease, as G. Simon believes, or upon the marked accumulation of fat—smegma—as Wedl suggests.

Acne is not at all uncommon. I have known this disfiguring eruption disappear soon after cure of uterine disorder, aided by iodide of potassium, arsenic, and other appropriate remedies.

Fugitive attacks of erythema, erysipelas, or furuncle, are more frequently observed during the anæmia of amenorrhœa, but are not uncommon at the climacteric period.

Nervous Symptoms or Complications.—The seat and intensity of the *pain* are very variable. There is most commonly a painful sense of weight, pressure, at times of forcing, in the hypogastrium and pelvis. This is more or less constant, but is aggravated by standing, walking, or other exertion. There is often a sensation as of a large body tending to force its way out of the vulva. On coughing, sneezing, or other forcible expiratory acts, the pain is increased, and these bring out new pains in the loins, sacrum, and groins. There is often distress at the anus, and down the thighs. At the menstrual epochs, the hyperæsthesia is more generally diffused. The frequency with which pain is felt in those regions which are supplied by the lumbar plexus, is remarkable. It is deserving of attention in a diagnostic point of view, that the intense pain often complained of in chronic metritis in the inguinal regions is so explained, and is therefore not indicative of oophoritis. In two cases, says Scanzoni, in which an autopsy was made of women who had suffered intensely from pain in the ovarian region, so that he was all but convinced that they had organic disease of the ovaries, these organs were found perfectly sound. Bennet, as we have seen, has long insisted that this pain is pathognomonic of chronic inflammation of the cervix. I have on several occasions known intense ovarian pain produced at the moment of touching an abraded surface of the os uteri with caustic.

The nerve most frequently affected appears to be the ileo-hypogastric. The pain often runs along the course of this nerve from the anterior border of the crest of the sacrum, downwards to the inguinal ring. When the pain extends to the labia pudendi, we have to conclude that the external pudic nerve has been seized. I have known this, or the external pudic nerve, to be the seat of persistent pain concentrated there, of the most distressing kind. It seems as if, after long irritation of the nerves involved, pain settles in a particular branch, and becomes difficult to dislodge, even after the disease which provoked the nervous trouble had ceased. This remark applies peculiarly to the dorsal, lumbar, and sacral aching pain which often lasts weeks and months after the uterus has been restored to a comparatively healthy condition. In these cases, it seems highly probable that the long-continued irritation of the lower part of the spinal cord has induced a chronic alteration of nutrition. This lingering ill is often the source of disappointment and discouragement to patients who have really recovered from metritis. It is necessary to explain that effects do not immediately cease after the cause is removed; that the return to healthy nervous function, to vigorous muscular power, is necessarily gradual. Muscles long disused have fallen away; all the functions exhibit the weakness of structure of the organs which execute those functions. Healthy tissues can only be built up by regulated exercise and other hygienic measures.

A not uncommon attendant symptom of chronic metritis is the "*Coccygodynia*" of Simpson. This is sometimes so distressing that the sufferer cannot sit in the ordinary way, but is obliged to rest upon one or other ischium; and some women on this account constantly use an air-cushion. Pain is often felt on defæcation. Since the metritis to which this pain is due, itself probably arose after labour, it is natural to conjecture that the sacro-coccygeal joint received injury during labour, and became the seat of chronic inflammation. In some instances this is really the case. But in most no evidence, beyond the pain, will be found of local mischief. It is a form of neuralgia. It is, however, desirable to determine the local condition by examination. For this, the forefinger of one hand is passed into the rectum, whilst the other hand feels along the sacrum or down the joint externally. In this way the joint is closely approached on either side, and the relation of its constituent bones, the mobility of the coccyx, the condition of the joint can be accurately made out. The removal of this sacro-coccygeal neuralgia must be waited for in the same way as the subsidence of other nervous disorders, when the causing disease is cured. Dysuria and dyschezia are apt to be especially troublesome at the menstrual epochs.

A nervous affection of a peculiarly distressing kind is *pruritus vaginæ et vulvæ.* This is not an uncommon symptom of chronic metritis. It is due to the general hyperæsthesia of the pelvic nerves, and, in some cases, to inflammation of the mucous membrane. The nervous filaments distributed in the papillæ being involved, of course present extensive points of peripheral irritation. Where there is inflammation of the mucous membrane, there will commonly be more or less spasmodic contractility of the vulva, constituting vaginismus. But an equal degree of irritability is not uncommon where there is no local inflammation. This distressing complication is sometimes successfully treated by belladonna or morphia pessaries. But the only effectual remedy is the use of the "vaginal-rest."

The wear and tear of the nervous system, and the degradation of the blood attending chronic metritis, hardly ever fail to bring about disturbance of distant parts. This is manifested in various sympathetic nervous disorders. One of the most frequent is *facial neuralgia.* The association of this disorder with uterine and ovarian trouble, is placed beyond doubt by the exacerbations which so often accompany the menstrual periods. *Hysteria* is another frequent attendant. Where the disease has lasted some years, being prolonged into the climacteric age, the nervous disorders characteristic of that epoch will be earlier and more strikingly produced.

A symptom, says Peaslee,* almost pathognomonic of uterine affections, is the "*uterine headache,*" referred to the top of the head, usually extending over a circular or oval surface, and relieved by pressure. Sometimes a "crazy feeling," a sensation of cold or heat, or a numbness is complained of, or the surface is tender on pressure, or hot.

The Symptoms and Diagnosis.—The disease is usually so protracted, coming under treatment, perhaps, long after its earlier stages have been passed through, that it is difficult to gather up a complete orderly history of the symptoms. The later symptoms will, in many respects, differ from the earlier ones. Still, the subjective symptoms, when corrected and complemented by the objective ones, are clear enough to mark what is going on.

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* "American Medical Monthly," 1860.

The most marked symptom is acute hypogastric pain, differing from the pains of retention by being persistent, and becoming more intense. It frequently comes on suddenly, with initial protracted rigor. Fever is constant in acute metritis, and not rare in the chronic form. Inflammation is apt to spread to the surrounding organs, and if the peritoneum become involved, as it frequently does, the pain may extend from the pelvis to the abdomen. The patient complains of a feeling of burning heat in the hypogastrium, vagina, and vulva. She usually lies on her back, with the knees drawn up.

On examination, the vagina feels hot, tense, tumid; pressing the cervix uteri produces acute pain, especially if so pressed as to move the uterus. Arterial pulsations may be felt in the utero-vaginal sinuses. The uterus is felt to be increased in bulk. If the sound be introduced—and this ought to be avoided if we find the foregoing signs present—the most acute pain is caused by the passage along the cervix, and some oozing of blood is very likely to ensue.

The diagnosis, indeed, admits of being perfectly established without the sound. The state of the uterus—perhaps softened, easily bleeding, even easily penetrable by the point of the instrument—is a valid reason for not using it.

The pain is intensified by movement, by the slightest jar or shock, and even by the action of the bowels or bladder. If acute metritis attack during menstruation, the menstrual flow is commonly suppressed. In the chronic form it may also be suppressed; but sometimes an attack of menorrhagia or metrorrhagia supervenes. Dysmenorrhœa is almost inevitable. Suppression of menstruation is more characteristic of parenchymatous metritis. When the mucous membrane is principally affected, there is more often menorrhagia.

Nausea and vomiting are hardly ever absent. Bennet looks upon nausea as a characteristic symptom of parenchymatous inflammation. The active engorgement of the vessels and tissues stretching the uterine fibre accounts for this symptom.

The "*facies uterina*" is commonly well marked. Sterility is almost constant in metritis. In the acute stage pain would prevent intercourse, and in the slower chronic forms the altered tissues and secretions are unfavourable to conception, and to the retention of the embryo in the rare event of conception taking place.

In the more chronic forms of metritis, the simple vaginal touch may not in every case produce pain. If the surrounding structures be not involved, so as to impede the mobility of the uterus, and the body of the organ be the chief seat of the inflammation, it rises and retreats before the examining finger, so that the tender inflamed part escapes pressure. But when we combine external pressure by the hand above the pubes, pushing the fundus down, we evoke pain by bringing the inflamed part under compression.

By this mode of examination we are sure to bring out with precision the signs of disease in the uterus; and by, in like manner, examining the remaining organs in the pelvis, we may exactly trace the disease to the uterus.

The enlargement of the uterus which always attends metritis, chronic or acute, is easily determined by the abdomino-vaginal, or the recto-abdominal touch. The fundus of the uterus in acute puerperal metritis almost invariably rises above the symphysis pubis. In the non-puerperal acute, and in the chronic forms, it is usually not difficult to feel the fundus by pressing the fingers a little firmly behind the symphysis, having previously emptied the bladder. Indeed, in the acute and sub-acute forms, the fundus may be generally felt three or four inches above the symphysis. If the inflammation arise out of, or be associated with, cancerous, fibroid, or other disease, the enlargement of the body of the uterus is usually greater, and the fundus rises proportionally so as to be easily reached.

This enlargement of the uterus imparts some degree of tumefaction to the lower abdomen. And it is a point to attract attention, that the tumefaction or distension of the abdomen is almost always much greater than the mere increase in size of the uterus can account for. The surplus is, I believe, often due to the disturbance in the state of the intestines, which the neighbouring inflamed organ produces. All parts in contact with an inflamed organ are constantly disordered. This is especially the case when movement is a necessary condition to the due performance of the organs implicated by proximity. The intestines are in this case; and they appear to be compelled to a state of inaction or paralysis, in order to spare the sensitive inflamed uterus. Hence distension. This is made manifest by tympanites.

So long as the inflammation is limited to the uterus, not involving the peritoneum or the broad ligaments, the uterus remains mobile. If it be found at all fixed, we may conclude that the inflammation has extended to the surrounding structures. Although in a large proportion of the cases of chronic metritis the uterus retains its mobility, we must always be prepared for extension of inflammation to the neighbouring parts. In acute metritis the uterus is almost invariably more or less fixed. When this occurs, as it may do under the influence of cold, over-exertion or violence, especially if encountered during a menstrual period, there will be exacerbation of pain, and this more widely spread; and there will be some febrile excitement.

Metritis may be mistaken for congestion, fluxion, uterine tumour, or perimetric disease. The diagnosis will be made out by the comparative study of the description given of these several disorders.

In simple congestion, fever is usually absent. There is not the burning heat in the vagina, nor the same degree of tenderness of the uterus.

The *duration* of acute parenchymatous metritis, if not complicated with septic conditions, or perimetritis, is generally from a month to two months. The usual termination is in resolution.

But in patients who have neglected care, rest, and appropriate treatment, and especially in those who are the subjects of strumous or other morbid diathesis, or who are simply of weak constitution, the inflammation merges into the chronic form, and is not unlikely to spread to neighbouring structures.

Perimetritis, or inflammation of the peritoneal investment of the uterus, will be more conveniently described in connexion with pelvic cellulitis and pelvic peritonitis in a subsequent chapter.

The Curability of Metritis, Acute and Chronic.—There can be no doubt in the mind of those who have had large opportunities of observing puerperal diseases, that acute and even sub-acute metritis is often followed by virtual, if not complete, recovery. We cannot avoid this conclusion, if we accept as evidence of restoration the return to healthy functional activity. Who has not known women who have suffered metritis after labour or abortion, subsequently menstruate easily, become pregnant, go through labour, lactation, and resume the duties of life with comfort? It is scarcely possible that a history such as this should be frequent, if any decided uterine disease persisted.

The case is somewhat different, however, with chronic metritis. Slow changes of tissue, continuing over months and years, are with difficulty counteracted. Still, appealing to the same evidence which proves the cure of acute metritis, we cannot absolutely deny the curability of chronic metritis. Pregnancy is assuredly, if I may trust my own observation, not infrequent. It sometimes, no doubt, takes place whilst the uterus is still in an imperfectly restored condition. But the value of this test of return to functional work is strong. I think this fact should qualify the discouraging conclusion of Scanzoni that, perhaps, with the exception of some extraordinarily rare instances, it is not in the power of the physician so to cause the tissue-changes of chronic metritis to disappear, that the uterus is completely brought back to its normal condition. When once the process of hypertrophic induration with condensation of tissue has been accomplished, it is certainly contrary to experience to find that, either by internal remedies or by local applications, we can reverse the process which has taken place, cause the new material to be absorbed, and restore the uterus to its pristine condition. We have the clearest evidence of the permanent character of the tissue-changes wrought by chronic metritis brought directly under our senses in the chronic hypertrophic elongation of the cervix. Growth with induration having taken place, it may be confidently said that nothing short of surgical agency will remove the disease. It may by analogy be contended that like changes in the body of the uterus will be equally permanent. Although this part is liable to similar tissue-changes, still this does not appear to be so frequent. Now if, as Scanzoni himself asserts, there is no such thing as chronic metritis absolutely limited to one part of the organ, of course when we have hypertrophic induration of the cervix, about which there can be no doubt, before us, we must infer that the body of the uterus is similarly affected. Now, it is a fact beyond dispute that pregnancy is not uncommon in cases of very advanced, even extreme, hypertrophic elongation of the cervix. I have notes of many such cases. Some are described in my *Obstetric Operations*, 3rd edition. We are driven, then, to conclude that the hypertrophy resulting from chronic metritis may either be so far cured that the uterus can resume its highest function, or that the persistence of the hypertrophic change is not an absolute bar to this resumption of function, or, what is more likely than either, that the hypertrophy of the cervix, a part not essential to pregnancy, may exist without involving the body of the uterus.

This brings us to another question of great practical interest. *What is the influence of pregnancy in curing chronic metritis and its results?* If we assume that all must be cured before gestation can go on, of course the question falls to the ground. But if, on the other hand, we assume that conception may take place and gestation proceed to term, in an organ which is the seat of chronic metritis or of its results, what will be the effect upon these conditions? Speaking from clinical observation and analogical reasoning, I feel confident that, under this condition, a cure may be effected, that is, that the new hypertrophied tissue may be removed, and the uterus brought back to its pristine state, or nearly so. Instances have come under observation proving that fibroid tumours have been dispersed by absorption—I do not mean by sloughing or by casting off in mass, more common events—under the influence of pregnancy. These tumours, composed of tissue, not dissimilar from that of the morbid hypertrophic element, are caught in the involution-process, which reduces the normal hypertrophic element, and like it, they vanish. Is it not in the highest degree probable that the new hypertrophic matter, uniformly distributed in the midst of the proper uterine tissue, may be equally caught in this absorption-process, and be thus removed? I have seen distinct diminution in bulk of the hypertrophied cervix follow upon labour. But I have also seen hypertrophy of this part persist through several pregnancies.

I think, then, we may conclude that the uterus hypertrophied under chronic metritis may be restored, at least, sufficiently for the resumption of its duty. And if the morbid hypertrophic matter can be removed by gestation, why not by other means? I do not pretend that other means at our disposal are of equal efficacy with pregnancy. But if we can establish a reasonable presumption that the condition is curable by any means, surely we need not despair of finding other means that may accomplish the same end.

Again, uterine fibroids occasionally undergo a process of degeneration or atrophy, the senile involution, after the climacteric. The proper uterine tissue itself undergoes this atrophic involution. Why should not the abnormal hypertrophic tissue undergo the like change? As a rule new formations are more ready to undergo atrophy by absorption or degeneration than healthy tissue; and, as a matter of observation, I think I shall be supported when I affirm that hypertrophic induration, the result of chronic metritis, does undergo atrophy under this condition.

It is in accordance with general opinion that active inflammatory process of the uterus and ovaries tends to spontaneous remission and cure at the climacteric period. Ceasing to be stimulated by the periodical hyperæmia of ovulation, the local inflammation naturally subsides. But we must not hastily conclude that uterine disease will always undergo spontaneous cure or alleviation at this period. In many cases the disease continues, often attended with hæmorrhage. The morbid action, once set going, is maintained by the hyperæmia of obstructed venous circulation, and by the disposition to local hæmostasis so common at this period of life. And there seems to be also a more or less persistent ovulation-effort going on, in many cases, for years after the climacteric has, according to all presumption, arrived.

Scanzoni urges many reasons why sterility is the doom of women suffering from chronic metritis. 1. There is the accumulation of more or less unhealthy secretion. 2. Premising that the shedding of the mucous membrane itself is much more common than is generally thought, he says he has never known a case in which considerable fragments of mucous membrane having been regularly cast at each menstruation the woman has conceived. The membrane is cast just at the end of the period, the very moment when the impregnated ovum wants a decidua to attach itself to. 3. The ovaries are frequently implicated in chronic metritis. 4. There is pain or indifference attending the sexual act.

Certainly sterility is a frequent consequence, but it is far from universal. Scanzoni himself admits that pregnancy may occur, and he rightly says that its course is generally unfavourably affected by the morbid state of the uterus.

Can the so-called benign tumefactions caused by chronic hyperæmia and inflammation pass into cancerous degeneration? This is another question often anxiously put. The evidence in support of the affirmative is very fallacious.

The treatment of acute metritis will be governed by the opinion we may form as to whether the case is one of metritis simple, or of metritis complicated with septic infection. In the former case the treatment will be more purely antiphlogistic. Twelve to twenty leeches may be usefully applied above the pubes. Aran and most French physicians advise six or eight leeches to the cervix uteri. Fomentations give relief. A plasma consisting of one drachm of extract of belladonna mixed with half-an-ounce of mild blue ointment and two ounces of simple cerate, spread in a thin layer on a piece of lint, and applied to the hypogastric region, the whole covered over with a light packing of cotton wool, will not only give ease, but be of material use in subduing the inflammation. Experience has proved the importance of completely securing the surface covering inflamed organs from contact with the air. It is by acting in this way that the cotton-wool packing undoubtedly does good.

It is desirable to unload the rectum of any fæcal accumulation by an enema. But this done, it is not advisable to disturb the inflamed parts by purging until the acute stage is past. When the stage of resolution is advanced, purgatives are useful. Püllna, Hunyadi, or Friederickshall waters answer well.

Tepid vaginal irrigations with water or decoction of poppy-heads, or with a little laudanum, are useful.

In the beginning there is nothing that acts so well as calomel and opium. One grain of calomel, with half a grain of opium, may be given every six hours for a day or two, taking care to stop short of salivation. After this salines, especially the acetate of ammonia and nitrate of potash combined with sedatives, constitute the best internal remedies.

It is needless to add that absolute rest is the essential condition of successful treatment in the more acute forms of the affection. Precaution is especially necessary when the menstrual epoch is approaching.

When there is septic complication, leeching must be avoided. The mercurial belladonna ointment may, however, still be useful.

Salines must be early combined with, or give place to bark, quinine, and general tonic treatment.

The discharges should be carefully examined. If they be in any degree offensive, tepid intra-uterine injections of weak solution of permanganate of potash or carbolic acid should be used. Septicæmia is kept up by the continuous or intermittent imbibition into the vascular system of fresh doses of septic matter. The system may frequently be able to throw off a moderate dose of the poisonous element, and the local inflammation as well as the general disturbance may soon subside if the renewal of the irritating cause be prevented.

The treatment of chronic metritis is conducted essentially on the same principles as that of arrested involution. The first question to decide is as to the application of what is called antiphlogistic treatment.

Upon the usefulness of local abstraction of blood, opinions are very much divided. The indication seems clear to relieve the local hyperæmia which is so essentially concerned in the genesis and maintenance of the disease. And I am willing to admit that great ease is often felt by patients after leeching the cervix uteri. But it has appeared to me that this benefit is chiefly experienced when the disease is in the early or sub-acute stage, that is, during Scanzoni's first stage of infiltration. When induration has set in, I believe not much good is to be expected from bleeding. And the indication to relieve the tension of the local circulation may often be greatly met by supporting the loaded organ at its proper level by a lever or other suitable pessary. This contrivance will often not only facilitate the return of blood by the veins, but it also, by nursing the uterus, as it were, secures a degree of rest which is essential to cure. There is always some degree of prolapsus, if not of version or flexion, which involves more or less strangulation of the vessels at the point of their entry and exit. If this sinking or displacement be counteracted, one great cause of the maintenance of the disease is *pro tanto* mitigated. This mechanical support will be useful chiefly in the earlier stages, but it will be of service at times all through. One great recommendation of it, is that it renders "lying down" less necessary. I am sure that in many cases a woman will obtain more effectual "rest" for the uterus, by a properly adapted pessary, whilst taking a moderate dose of exercise, than she will by rigorous "lying down" without it.

If, therefore, leeches be employed, it will be wise to watch the effect well, and not to repeat them unless we are well assured that they do what is wanted of them by relieving gorged vessels.

It is well to remember—I do not mention this as an objection to the proper use of leeches—the more or less troublesome events that may attend their use, to which reference has already been made.

Scanzoni, who is a strenuous advocate for leeching, signalizes another consequence. He describes a peculiar erythema or urticaria which comes on a few minutes after the leeches have taken. A shudder or even a rigor is followed by swimming in the head, disorder of the senses, even delirium. Then the urticaria blebs come out.

Leeches should not be applied when there is marked anæmia; when the signs of acute hyperæmia are not present; when the disease is of long standing, and the induration process has made way.

Warmth is of the greatest service in the treatment of chronic metritis. When there is an exacerbation of pain from fatigue or exposure, heat may be applied dry, by heated bags of salt or bran, or water, to the hypogastrium. But in almost every stage, warmth, combined with moisture, renders eminent service. The whole bath at a temperature of 90° to 95° F. is perhaps the best method of applying it. It acts in a twofold manner. It exerts a not unimportant resolutive influence upon the gorged, loaded uterus. Not that any marked power can be proved in promoting absorption when the organ has become hypertrophied and indurated. But in the earliest stages, there seems reason to believe that warm moisture may aid in relieving congestion. No one doubts the beneficial soothing action of hot fomentations on superficial phlegmasiæ. A similar action can be exerted on the uterus. Secondly, warm baths are useful in promoting a healthy secreting action of the skin; and this is an essential condition of the relief of internal hyperæmic processes.

The hip-bath may often be conveniently substituted for the whole bath, although it is open to the objection that it compels an uncomfortable position.

To get the full benefit from warm baths, it is necessary to give the water free access to the vagina. This can be accomplished by the use of the bath-speculum. The most convenient form is a conical one, with a very wide inferior opening. The cone—the part introduced into the vagina—is perforated with holes the size of a sixpence. The patient can easily apply it. Another method is by irrigation. The warm douche can be kept playing upon the cervix for fifteen or twenty minutes at a time, either by help of a syphon, or of a Higginson's syringe.

In many cases, the value of warm baths is enhanced by the addition of various medicinal substances. Amongst those I have found the most useful are Vichy salts, or the Woodhall Spa waters. Gallard, however, cautions against the prolonged use of Vichy or other alkaline or mineral waters. He advises, in preference, more simply thermal springs, as Plombières.

The general treatment should be sustaining and tonic. Iodine, iron, strychnine, quinine, and arsenic, become extremely useful when active inflammatory conditions have been subdued.

Of late years, so-called resolutive pessaries of iodine, made up into conical balls, with cocoa-nut butter or other ingredients, have been largely used. Most patients find it troublesome, if not difficult, to apply them properly; often, whether from being badly made or other causes, they fail to melt down *in sitû* as desired; and, not seldom, they are a source of so much irritation that they have to be given up.

I have, for some time past, found it better to introduce into the cervical canal, or into the cavity of the uterus, iodine ointment or solution by means of the instrument figured at p. 164.

The subject of intra-uterine medication will be more fully discussed when dealing with Endometritis.

Since intra-uterine medication can only be carried out by the physician, and as it is essential to apply iodine frequently, the method of Scanzoni can be employed at the same time. This consists in introducing, by means of a small bath-speculum, a drachm of iodide of potassium in an ounce of glycerine to the fundus of the vagina, keeping it there all night. A better plan is to apply a pledget of cotton-wool soaked in the iodized glycerine by means of the speculum figured at p. 166.

C. Mayer speaks highly of the value of pyroligneous acid in treating the bleeding papillary affections of the os uteri and cervical canal. He says there is no more efficacious means. He applies it either alone or with equal parts of aqua creasoti, through the speculum. It is left in contact long enough to stop the bleeding, and until the abraded spot assumes a white appearance. It is then washed away by a syringe. For this condition I have found the acid nitrate of mercury recommended by Henry Bennet more useful.

Amongst the most effective measures for substituting a healthy for the morbid nutritive process going on, and of promoting absorption of morbid tissue, are the various forms of cautery, actual and potential. The actual cautery was extensively used by the late M. Jobert. It was in his clinique at St. Louis that I first became acquainted with its action and use. I think it would have become more firmly established as a resource in the treatment of the results of chronic metritis, were it not for the fear lest so potent an agent may do harm, and the formidable preparations which the use of the hot iron involves. Paquelin's cautery greatly lessens these objections. With this apparatus, where simple cautery is required, we may dispense with the cumbrous galvano-caustic apparatus.

The following precautions are necessary when applying the incandescent iron to the vaginal-portion:—1. To use a horn speculum, which is less heat-conducting than metal; or else, if using a metal speculum, to interpose a packing of lint outside the blades, so as to protect the vagina. 2. To be careful to have nothing in the field of the speculum but the vaginal-portion, so that no risk be run of cauterizing the vagina. 3. To apply the cautery to the outer edge of the os uteri, avoiding the cervical cavity. It is useful to apply a bit of ice immediately after the cautery, or to syringe the vagina with a stream of cold water.

The best substitute for the actual cautery is the potential cautery. Various caustics have been used. They all act substantially in the same way. By chemical action they kill a portion of tissue, which is thrown off as a slough or eschar, leaving a sore which has to heal by granulation. During this healing, some amount of absorptive action is set up in the proximate tissues; and the healing taking place by cicatrix, further diminution of bulk is effected by the contraction.

The substances most employed are: the acid nitrate of mercury—this is very convenient and effective; potassa cum calce fused in sticks—this is the most convenient and generally useful caustic with which I am acquainted. It differs from the acid caustics, such as nitric, chromic, and sulphuric acids, which, absorbing moisture rapidly, and coagulating albumen, produce only a superficial slough. Potash also has a great affinity for water; but not possessing the property of coagulating albumen, it is carried more deeply into the substance of the part to which it is applied. Herein consists the advantage it possesses. Upon this penetration it is that the absorptive action it sets up depends.

The time selected for applying it should be within a few days after the termination of a menstrual period, so as to secure ten days or more for the granulating process to go on undisturbed by the menstrual flux.

The mode of using it is to introduce the speculum so as to get the vaginal-portion well into the field; to wipe off all adhering secretion; then, holding a small piece of the potassa cum calce in a long speculum-forceps, to rub it across one or both lips of the os uteri several times. This produces a blackish bar. Care should be taken not to touch beyond the hard substance of the cervix, avoiding the vagina. When a sufficient application has been made, a pledget of cotton-wool steeped in vinegar is immediately applied to the part. This, neutralizing any remains of the caustic, obviates extension of its action to the vagina. A bit of string attached to the wool, enables the patient to withdraw it, which may be done in a few hours. Unless these precautions be adopted, cicatricial bands or contractions may ensue.

After such an application no further local treatment is necessary until after the lapse of ten days. The granulating surface may then be lightly touched with nitrate of silver, or tincture of iodine.

At one time a very favourite remedy, one employed, it is true, without precise diagnosis of metritis, was blistering by tartar-emetic ointment. By rubbing this substance over the groins or hypogastrium, or inside the thighs, a revulsive action is produced, which is sometimes serviceable.

It has been recommended to establish a seton in the vaginal-portion as a derivative and resolutive. I have not put this to the test; but I can quite understand that it may act beneficially. The potassa cum calce, however, answers the same indication.

The cautery, potential or actual, should not be employed whilst there is any degree of active inflammation. It comes in most beneficially when vascularity is subdued, where there is a languid process of tissue-change going on.

Laxatives become important in chronic metritis. The compound decoction of aloes and lenitive electuary are useful forms. But I have found the greatest benefit from the daily or occasional use of a pill containing two grains of watery extract of aloes, half a grain of extract of belladonna; half a grain of extract of nux vomica with Castille soap.

Scanzoni speaks emphatically against the plan of enforcing the "*repos absolu*," that is, "lying-down," as one of the most serious errors that can be committed. I have seen so much evil from this course, and have seen so many women who had been kept for months in the recumbent posture, not only without benefit, but with decided detriment, get well quickly when subjected to a more liberal treatment, that I heartily endorse Scanzoni's conclusion.

Scanzoni says the Friederickshall, Püllna, Kissingen, Ems, Carlsbad, and the other waters, act only on the diseased uterus through their virtue as purgatives.

In all chronic uterine diseases the habitat becomes an important matter. Women, far more than men, especially when invalids, are "adscriptæ glebæ." If the soil be damp, or other hygienic conditions be unfavourable, women suffer seriously, and often in such a degree as to frustrate the best-directed medical treatment. Change of air, then, which means change of soil, is often essential to recovery. A dry elevated site is generally the most suitable.

The restorative treatment comes into use when the local disease has at least, in part, subsided. Iron is usually badly borne whilst inflammation, no matter how slight, is going on. The way must be prepared by salines, laxatives, bismuth, and other agents which allay irritation of the stomach.

ULCERATIVE PROCESSES.

Besides the uterine abscesses, the result of acute metritis, the cancerous and tuberculous ulcerations, and the puerperal suppurations, ulcers occur on the vaginal-portion.

In the course of uterine and vaginal catarrh there arise excoriations or abrasions of a stellate or annular form around the os externum which commonly extend into the cervical canal. These at times pass into erosions and ulcerations marked by papillary granulations, of a fungoid aspect, or the surface is tuberous through the exuberant development of ovula Nabothi. The origin and persistence of this state are favoured by hypertrophy, hyperæmia, and varicosity of the vessels of the vaginal-portion.

The so-called *phagedenic ulcer*, the *corroding ulcer* of Charles M. Clarke, of the os uteri, is very rare. Its existence otherwise than as a stage of cancroid or cancer is questioned. But I believe I have seen it as an indented hollowed ulcer on a hypertrophied, hard, callous vaginal-portion, eating away the cervix uteri, and seizing upon the neighbouring structures, in a manner very similar to that of lupus exedens.

The *syphilitic ulcer* possessing the proper characters of the primary chancre is not common; but it may at times be observed exhibiting a closely similar aspect to that which is seen on the penis, and producing in like manner sores more or less sharply defined on the vaginal duplicature which lies in contact with the cervix uteri. On examining by the finger, the sharply-defined edge of the syphilitic sore may at first impose on the sense of touch for the os uteri, the pit or depression formed in the fundus of the vagina is so distinct. It is best treated by nitric acid, the acid nitrate of mercury, or the actual cautery.

ENDOMETRITIS: UTERINE CATARRH.

Inflammation may be more or less limited to the lining membrane, constituting endometritis. This may take its rise in childbirth; and it may be general, or chiefly restricted to the original seat of the placenta. The placental seat remains rough, presenting papillary projections; perhaps one or more may be large enough to deserve the name of polypus.

In the case of endometritis proper, the uterine contraction after labour has been efficient, so as to prevent the entrance of septic matter into the venous channels and lymphatics, and thus to obviate metritis.

Where the constitution is sound, free from morbid diathesis, endometritis, treated early, admits of easy cure. Rest alone may be sufficient. The regenerative power of the uterine mucous membrane is so active, that the degenerated tissue being cast off, a new sound one is easily formed. But if there be a morbid diathesis, as strumous, tubercular or syphilitic, the cure may be indefinitely protracted. The mucous membrane of the uterus and its glands is not less prone to receive the stamp of these diatheses than is the mucous membrane of other organs. The strumous mucous membrane of the uterus is tumid, undergoing constant epithelial shedding, its glands are hypertrophied, and secrete an excess of mucus. This, in fact, is one of the most troublesome forms of uterine catarrh.

Chronic endometritis leads to the exuberant production of ovula Nabothi in the cervix and on the vaginal-portion. Indeed, Lancereaux has designated this as "cystic metritis." In some cases the cervix is virtually closed by a collection of cysts disposed in a loculated stroma, and containing gelatinous mucus, compressing each other. The vaginal-portion is hard, tuberous, from the distension caused by these projecting distended sacs. Often, one or more of these cysts make their way through the os externum, and, becoming more pedunculated than the rest, appear in the vagina as vesicular polypi.

When these occur in women past the climacteric, the touch and appearance forcibly suggest the suspicion of commencing malignant disease. The shot-like hard projections around the os; the red, or bluish-red, angry-looking mucous membrane in which they are set, make up a condition hard to distinguish. Usually, however, the vaginal-portion does not become so large as in cancer; it does not become fixed, and it is less apt to assume the mushroom shape. It is best treated by decided applications of actual cautery, or of potassa cum calce.

The ovula Nabothi are partly closed dilated mucous sacs of the mucous membrane of the cervix, but much more frequently they appear as small collections of nuclei at various depths in the submucous tissue of the cervix; these capsules grow with transformation of the nuclei to cells, and project upon the surface where they dehisce, or prolapse as polypi. They contain a gelatinous mucus, mixed with cells and nuclei, fat-globules, spindle-shaped and many-branched cells, and colloid granules.

When there is free secretion of mucus, these polypous, mucous-membranous growths, vesicular polypi, and small sarcomata lead to contraction or even closure of the os uteri, by means of a richly nucleated, fibrillous outgrowth of connective tissue. This leads to retention of the gradually increasing pus or mucus in the uterine cavity and cervical canal. The uterus may thus be distended to the size of a goose's egg, of a fist, or even to that of a man's head; its walls become hard, sometimes thinned; its mucous membrane is transformed into a smooth or papillary connective tissue growth ; its contents are a colourless synovial-like, or yellowish, red-brown, or chocolate-coloured glutinous-fatty fluid showing cholesterine or pus. This is the so-called *hydrometra.* When the canal of the cervix gets distended, in like manner, the os internum remaining narrow, the hour-glass form of uterus is produced—the *uterus bicameratus.* In some rare cases, perforation has occurred through an ulcerative process allowing the contents to escape into the peritoneum.

This distension of the uterus almost necessarily leads to retrograde distension of the Fallopian tubes, which are even more likely than the uterus to undergo perforation.

Within the period of generative capacity, chronic catarrh may lead to hypertrophy of the uterus. During decrepitude, it leads to relaxation and a pulpy state.

An *exudative* or *croupous endometritis* is seen in rare cases as a secondary appearance in the course of typhoid, cholera, exanthemata ; and especially with a diphtheritic inflammation of the vagina in childbed.

Bennet says internal metritis is a rare form of uterine inflammation ; that it has only been considered common because it has been confounded with inflammation of the cavity of the cervix, a disease which is very common. On the other hand, it may perhaps not unfairly be said that internal metritis, being out of sight, may often escape recognition. Certain considerations, however, incline me to think that the reaction against Bennet's too exclusive limitation of inflammation to the cervix, has been carried too far :—1. In a large number of cases, treatment directed solely to the os and cervix uteri cures all the disease. 2. Not infrequently, before the cervical disease is healed, pregnancy, a function which pertains to the body of the uterus, and which therefore implies a healthy condition of that part, occurs. 3. The proportion of cases in which it is necessary to resort to intra-uterine medication, although certainly greater than Bennet would seem to acknowledge, is limited. 4. The cervix is far more subject to injury in parturition.

Generally speaking, endometritis proper takes its origin in imperfect involution after labour or abortion, in obstructed or interrupted menstruation, and in irritation from foreign bodies ; whilst inflammation of the cervical cavity far more frequently takes its rise in the traumatic process of labour, in excessive sexual intercourse, and in infection. Under common origin, or by extension, there may be, and frequently is, co-existent inflammation of the mucous membrane of both cervix and body.

It is especially, however, subjects of strumous or lymphatic diathesis who are prone to this disease. It is remarkable what slight causes will in such subjects produce it. And it is in these that the disease is also most rebellious to treatment.

Uterine and Vaginal Catarrh.—The uterine and vaginal mucous membrane is liable to similar morbid influences to those which attack other mucous membranes. For example, it is liable to inflammation from suppression of function, as from cold acting whilst the membrane is in physiological hyperæmia. It is liable to be affected by morbid poisons, as variola, scarlatina, syphilis, measles, which are carried to it in the blood. It is liable to be affected by poisons or irritants directly applied, as the poison of syphilis or gonorrhœa, or, as in labour, by the poison of scarlatina carried by the touch.

Just as catarrh is produced in the air-tubes and intestinal canal by exposure to cold, damp, and irritating agents, so it is with the mucous membranes of the genital tract. The catarrh so produced is a subacute form of inflammation. The membrane becomes vivid red, there is a sense of local heat; and almost always there is a mucous discharge, more or less tenacious, and varying in colour from cream-white to yellow and yellowish-green; sometimes it is sero-mucous. If the discharge is yellowish-green, very abundant, and coming from a highly-injected surface, and the vagina and urethra be implicated, so that there is pain on micturition, the *presumption* is that the source of the inflammation is gonorrhœal infection. But the greatest circumspection is necessary in giving an affirmative opinion.

Gonorrhœal infection is only one of numerous causes of colpitis, which may involve the cervical and even the uterine cavities. In very many cases it is impossible to assign the particular cause. There is often no distinctive mark. Colpitis is colpitis. It is often no more possible—apart from history—to declare that a particular colpitis arose from a specific cause, than it is to declare the actual cause of a case of bronchitis. The practitioner, who is not on his guard, is constantly in danger of falling into etiological errors that may entail the most painful social and domestic consequences to the patient and others, and involve himself in serious complications. I have known the existence of leucorrhœal discharges in girls give rise to the suspicion of their having been abused, when there was the strongest reason to believe that the true source was struma, and in one or two cases, scarlatina. Here, as in so many difficult positions in medical practice, we must be content to limit our utterances, verbal or written, to the strictest conclusions from exact observations. The history or extraneous considerations must be rigorously excluded. To admit in these delicate scientific questions the historical element in forming a diagnosis, is to make our opinion the reflexion of the errors, the prejudices, the suspicions, the malice of others. Science has nothing to do with all this. The only safe course is to discard from our consideration everything but what we can subject to actual observation. The physician can diagnose colpitis when the disease is before him. He can only form a conjecture as to the cause, which cannot be before him.

The most common form is the *catarrhal endometritis.* This may be acute or chronic.

The *acute catarrhal endometritis* arises from the sudden action of cold, especially if acting at a menstrual period, from excessive sexual intercourse, from gonorrhœal infection; it occurs in acute fevers, especially the exanthemata. It is in cases of the latter kind that opportunities of studying the affection in the dead body occur. The mucous membrane of the body of the uterus presents red streaks or spots from injection, or it is uniformly red, more or less swollen, softened, here and there bleeding, and covered with a red-streaked mucus, or creamy fluid with pus. The submucous layer, is in severer cases, hyperæmic, softened, pulpy. The mucous membrane of the cervix is at times greatly injected, the contents of the ovula Nabothi are turbid; when burst, they yield a thinner fluid. The mucous membrane of the vaginal-portion is remarkably reddened, its papillæ are swollen, near the os externum abraded. The parenchyma of the vaginal-portion is itself swollen. The acute endometritis often passes into the chronic. The vagina also is frequently involved.

In acute catarrhal endometritis, Schrœder says the ciliary epithelium soon disappears, the secretion of the diseased mucous membrane increases; that of the body of the uterus supplies at first a thin watery serum, which soon becomes thickened with the cast-off epithelium-cells, and later by an abundance of pus-cells, so that the discharge finally becomes whitish and opaque or purulent (*Ziemssen's Cyclopœdia,* 1875). The vitreous secretion of the cervix, too, becomes turbid and purulent, and often streaked with blood.

Chronic Catarrhal Endometritis.—This is frequently a continuation of the acute form, and especially of repeated acute endometritis in cachectic persons. It is also frequent as the result of morbid deposits or processes in the mucous membrane, as tuberculization, or from the irritation of tumours protruding into the uterine cavities.

The mucous membrane of the body of the uterus appears uniformly or in patches reddened, swollen, spongy, decidua-like, or has a granular papillary aspect; it is covered with a mucous-purulent moisture or pus. Very often, chronic catarrh consists essentially in blennorrhœa, that is, in a condition of profuse secretion of a more or less hyaline or creamy opaque mucus, from a swollen, partly pale, partly injected, dark brown or greyish pigmented membrane.

The mucous membrane of the cervix is very often, but not constantly reddened, swollen, especially on the summit of its folds. It is commonly studded with Nabothian ovules, and covered with a clear or yellow-streaked turbid mucus.

The vaginal-portion is often swollen, the mucous membrane reddened, its papillæ swollen and injected. This condition and the simultaneous presence of small cysts, give it a villous granulating appearance. And not seldom there is actual excoriation or ulceration.

Although we can only admit the word "ulceration" as describing the loss of epithelial investment in the case which forms the subject of the last chapter with some qualification, it seems impossible to discard the term "inflammation" as inapplicable. It may be described as engorgement, congestion; but if this congestion, or whatever else it may be called, produce all the effects usually attending upon inflammation, the distinction becomes too subtle to be followed out. And when it is remembered that the increased action going on, takes place in a part exposed to frequent fluxions of blood, to functional work, to accident, it is hard to imagine how it can long escape passing the imperceptible boundary which rigorous theory, rather than actuality, places between it and inflammation.

One fact may at any time be verified, which appears to lend support to the theory that inflammation is an essential factor in the case. It is the abundance of chlorides in the viscous secretion exuding from the cervix. The concentration of chlorides in inflamed tissues is an established fact. The moment nitrate of silver is allowed to touch the cervical surface bared of epithelium, a dense opaque white layer is produced, and any viscid secretion is instantly turned into a white clot characteristic of chloride of silver. The indication thus obtained of the presence of an excess of chlorides is very marked, and it appears to me that it may be explained in the way described.

What is the seat of this inflammation? I should say it is exactly that of the original traumatism sustained in labour, namely, the cervix uteri, more especially the lower part of the vaginal-portion.

So far as it concerns the case under consideration, I agree with Henry Bennet. It is essentially inflammation of the neck of the womb, sub-acute, or chronic. I rest this conclusion more upon clinical observation than upon the anatomical grounds so much insisted upon by him. It is true that the structure of the body of the uterus differs from that of the cervix in that there is more connective tissue in the cervix, and also that the latter part is in more direct communication with the source of vascular supply. But the great reason why the cervix is more frequently the seat of inflammation is, that it is more directly exposed to injury. At the same time I am of opinion that chronic inflammation of the body, in a less intense degree perhaps, commonly attends inflammation of the cervix. Indeed, it is hardly possible for one part to escape being involved in a process which has seized upon the other. The tissue, muscular and mucous, is continuous; the vascular supply is nearly the same. And, as a fact, we observe by the touch and sound, that in these cases there is frequently some enlargement, and increased sensitiveness of the body of the uterus.

Still, there is a striking feature in uterine pathology which lends weight to Bennet's views. The frequent sharp limitation of tubercular disease to the body of the uterus, and of cancerous disease to the cervix, seem to point to some decided distinction in the pathological proclivities of these regions. And their physiological destination is equally distinct. Both incontrovertible facts point to a difference of structure which greatly favours the idea of a difference in liability to inflammation. Another fact forcibly insisted upon by Bennet is, that treatment applied to the cervix uteri is in the majority of cases sufficient to cure the patient. This appeal to the Hippocratic maxim, "Treatment reveals the disease," is difficult to resist. But it is not unanswerable. Counter-irritants applied to one part of a diseased structure may, by derivation, or by setting up healthy nutrition in contiguous parts, cure the whole diseased organ. And I am in a position to affirm that the cure is much more quickly attained if the treatment is extended to the body of the uterus.

It appears to me that attention has been too strictly fixed upon the visible changes in the cervix and os uteri; and that, thus engrossed, the mind has been closed against the less telling evidence of changes in the body of the uterus.

The body of the uterus which formed the nidus of the embryo, which underwent the most wonderful process of development, is liable to interruption in a process which concerns the cervix in a very secondary degree. Involution especially affects the body of the uterus. It has to repair the placental seat and to restore the mucous lining.

Disorders of involution, then, principally affect the body of the uterus. Traumatism principally affects the cervix. But in some degree both processes affect the whole uterus.

Although the formative elements of a new mucous lining exist in the cavity of the uterus at the time of the separation of the placenta and decidua, it can hardly be said that a mucous membrane, comparable in development to that of the cervix, exists. Whatever changes, then, of a pathological character occur in the body of the uterus after labour must have their chief seat in the walls of the body, if we except the placental-seat. That inflammation may spread from the lining membrane to the substance of the uterine wall can scarcely be doubted; but this inflammation does not often extend deeply. The more usual origin of metritis is in the invasion of the vessels and lymphatics by foul matter; the coats of the vessels are so delicate that irritation easily spreads from them to the substance of the uterus in which they run. The veins of the uterus can scarcely be said to possess distinct coats; at least, it is difficult to isolate a venous channel from the wall in which it runs; fibre-cells, identical with those of the uterine wall, are always seen in abundance in the walls of the veins. It is easy to conceive how a tissue, permeated by channels which carry irritating matter, may become inflamed in its substance. This may be actually seen in the acute septicæmic metritis of child-bed. Collections of pus are seen in the venous channels, and the surrounding muscular structure is softened. There is evidence enough to show, apart from analogical argument, that a similar process takes place in the non-pregnant uterus.

But, especially in young women, in whom the affection is the result of menstrual suppression from cold, the inflammation may be strictly limited to the body of the uterus. The neck being less concerned in the menstrual hyperæmia, and not subject to the same physical disturbance as in married women, more often escapes.

In such cases, examination, limited to inspection through the speculum, will fail to detect the intra-uterine disease. But in most cases the cervix becomes involved at no distant period.

Endometritis is a frequent consequence of obstruction at the os internum or os externum. Hence it is not uncommon in women who have never been pregnant, and even in virgins. The contracted os externum, by impeding the discharge of the menstrual fluid and ordinary uterine mucosities, leads to congestion, irritation, and inflammation of the lining membrane of the body as well as of the cervix. Retention by valvular closure of the os internum from flexion leads to the same consequences. The cavity enlarges under the distending influence of accumulation; the retained discharges undergo decomposition, resulting in irritating matter. It is not uncommon for women subject to this affection, to describe themselves as subject to "gathering and bursting of an abscess." That is, there is a stage of accumulation of muco-purulent matter, during which the pain of distension is felt, merging in spasm or colic, the pain of expulsion; and then, expulsion effected, relief is felt. The quantity of the fluid thus collected varies, and it is difficult by direct observation to define it correctly. But there is little doubt that it amounts in some cases to an ounce or more. The condition and the symptoms resemble in many points those of dysmenorrhœa from retention. Indeed, dysmenorrhœa is often associated with it, as arising from similar mechanical causes.

The discharge occasionally becomes exceedingly offensive, has acrid properties, causing redness of the vaginal canal and vulva; and is, in all probability, capable of exciting blennorrhagia in the male.

Endometritis may occur at all ages, beginning from the outset of menstrual life down to old age.

I have already said that endometritis may be limited to a particular area of the uterine cavity, and that this area is that which was originally the seat of the placenta. In many cases the return of this area to the normal state is slow and imperfect; and for weeks and months after labour it may present a rough surface, secreting a muco-purulent discharge, cut off by a sharp line of demarcation from the smooth, perhaps healthy, mucous membrane of the rest of the cavity. In the earlier periods after labour, the uterine wall at this part is thicker, and remains more vascular than at other parts; and this comparative thickness may persist for some considerable time. There is, in fact, imperfect involution, especially of this part of the uterus, as the first step of a condition which merges into partial endometritis and metritis.

Since the most common seat of the placenta is near the fundus, this variety of disease might be called "Fundal Endometritis." But this name has been used by Dr. Routh to describe a condition * which does not necessarily depend upon pregnancy. He says that part of the mucous membrane which lies between the Fallopian tubes is especially prone to inflammation. If he is correct in his interpretation of the cases he relates, he establishes the conclusion that there is an endometritis limited to this particular area, which has been confounded with general endometritis. Quoting Dr. Beck, he shows that the fundus is supplied with nerves by a branch coming from the ovary, that is, from a different source from that which supplies the lower part of the body and the neck of the womb. The symptoms are exactly those described by Dr. Gooch as belonging to the "irritable uterus." "The abdomen is painful just over the pubes. Indeed pressure here will often make the patient sick." If the sound be passed *per anum* or *per vesicam*, and the point be turned upon the fundus, pain will be produced. If passed into the uterus, there may be no pain until the point has passed the os internum, and has struck the fundus. "If it be pressed at all forcibly against the fundus, absolute agony may result, which may produce vomiting, an hysterical faint or fit, sometimes a regular epileptic fit." The disease, Dr. Routh says, is often the result of the use of intra-uterine pessaries, of retained menstruation, or the retention of mucoid discharges. Recognizing, as my own observations compel me to do, the limited endometritis of the placental seat, to which I confess to have been led more by post-mortem inspections at various periods after labour, than by clinical diagnosis, I am not prepared to accept without further evidence Routh's description. I concur in the opinions expressed by Tilt and Fordyce Barker, at a discussion on the subject in the

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* On "Fundal Endometritis," Obstetrical Trans., vol. xii.

Obstetrical Society, that the symptoms relied upon are not sufficiently distinctive. As Barker pointed out, the fundus is more sensitive than other parts of the uterus. When the sound touches it, pain is almost always felt; and this whether the organ be diseased or healthy.

I am disposed to merge fundal endometritis in general endometritis.

The inflammation may be chiefly limited to the cervical cavity. To specify this form, the objectionable term *endocervicitis*, a barbarous compound of Greek and Latin, is in common use. It would be better to sacrifice conciseness, and to speak of *endometritis* of the uterine neck. This is a very common affection; and from its seat being partly within direct observation by touch and sight, it has engrossed an undue share of attention. It is the source of the most common form of leucorrhœa.

The Course, Symptoms, and Diagnosis.—The diagnosis of endometritis rests upon the subjective symptoms, the history, and the objective signs. The patient complains of pain referred to the uterus, increased by exertion, attended often by dysuria; the pelvic pain radiates to the back, and there is more or less constant lumbo-sacral heavy aching distress. Headache is also frequent, and various nervous symptoms of a depressing character arise as the disease becomes chronic.

The history begins with pregnancy, with arrest of menstruation, with intra-uterine irritation or injury, as from wearing a pessary, with retention of menstrual discharge, with flexion or version; in short, the origin is in many cases the same as that of other forms of uterine inflammation. The symptoms have probably at first been acute; the uterine pain was intense, setting in with rigor, perhaps vomiting, and attended by fever. Passing into the chronic or subacute form, the pain has become less severe; it has been intermittent, brought out into exacerbations by over-exertion or by menstruation.

The objective signs are made out by palpation, by the sound and by the speculum. Palpation, vagino-abdominal or recto-abdominal, will generally establish increased weight and bulk of the uterus, and bring out pain or tenderness in the body of the uterus. The sound will commonly cause more pain than is usual on entering the healthy uterus; it will often cause a little oozing of blood. Unless there be flexion, the sound passes easily, because the orifices are almost certain to be expanded. And when the point is in the cavity, the dilatation of this part is made manifest by the freedom with which the sound can be turned round. The uterus has lost its flattened condition, having become more pear-shaped.

Diagnostic purpose being fulfilled, it is henceforth desirable to use the sound as little as possible. It is often a source of irritation. The speculum will in most cases show some amount of congestion of the vaginal-portion, perhaps abrasion or other lesion; but this is an accidental not a necessary complication.

Gosselin and Aran, describing the frequency of so-called ulcerations seen around the margin of the os uteri in chronic endometritis, affirm that they have little significance, and are generally the result of the maceration of the epithelium in the mucous secretions. As soon as the discharge lessens the ulceration heals rapidly. I must, however, remark that in most cases which follow labour, the loss of epithelium is due to the necrotic action I have described.

When chronic or subacute catarrh arises primarily, that is, without acute beginning, leucorrhœa is often the first symptom which attracts attention. Then pain on excretion follows. Dysmenorrhœa becomes more pronounced. This last symptom is the more important in women who previously had not suffered from dysmenorrhœa. There are many women in whom dysmenorrhœa may be called secondary, that is, it is acquired as a consequence of metritis or non-involution after labour.

Menorrhagia is a frequent attendant. The tumid, engorged, vascular mucous membrane easily allows blood to exude. The catamenia return in advance of the proper period, that is, every three weeks or fortnight, and last for a week or more, sometimes profusely. The blood-flow is commonly succeeded by a muco-puriform discharge; and not seldom, slight causes will determine a flow of blood in the intermenstrual periods. A common remark is that the flow returns a day or two after having apparently ceased, so that the subject hardly knows when the period is fairly at an end. Sometimes clots of dark blood "like leeches" are voided. In one case of intense endometritis the woman passed every morning a cylindrical mass about three inches long, slimy and streaked with blood. The glands become obstructed, presenting bluish eminences; the contents retained cause cystic elevations, sometimes becoming turbid. When punctured, puriform matter may exude. It is in these cases that scarification is so useful.

Dysmenorrhœa more especially attends the catarrhal inflammation of the body of the uterus, probably because this condition is apt to involve some degree of inflammation of the uterine wall itself. The form in which dysmenorrhœa appears is uterine, that is, pain is felt shortly before and at the time of the uterine flux; it is referred to the uterus or middle of the pelvis, and radiates to the loins and sacrum.

In the milder forms of catarrh, the discharge is chiefly mucus entangling epithelial cells; it may be clear or opaque. The hypertrophied uterine glands at times pour out a profuse, even exhausting, secretion. In severer forms it is often tinged with blood. This, Bennet says, is as characteristic as is the rusty sputum of pneumonia. It is due to the intense congestion, the blood easily permeating the thin epithelial covering.

The neighbouring organs are commonly somewhat disturbed. In the acute forms, even dysenteric symptoms may be produced. In the chronic forms diarrhœa is not uncommon, alternating perhaps with constipation. Diarrhœa in the acute form, however, is not alone the consequence of neighbouring irritation; it is more likely to be due to septicæmia. Both in the acute and chronic forms some bladder-distress is a frequent attendant. Dysuria and frequent micturition, and sometimes cystitis, are observed.

Disorder of nutrition and of the nervous system are sure to follow sooner or later upon chronic uterine catarrh. The abnormal derivation of vascular and nervous action leaves the digestive organs imperfectly supplied; and the constant wear and tear of pain exhausts the nervous centres. Hence the appetite is impaired, capricious, difficult to stimulate. Despondency, fretfulness, sometimes hysterical symptoms harass the patient. Nausea, vomiting, gastralgia, distension of the stomach follow. The urine becomes turbid, loaded with uric acid or phosphates, and sometimes with mucus. This is especially the case in women towards middle age, with a tendency to obesity and sluggish liver.

In other cases, the discharges and the impaired nutrition entail emaciation. The face puts on a dull, languid, worn expression; the *facies uterina* becomes formed. The features fall; dark circles surround the eyes.

Acute endometritis may end in spontaneous recovery. Perhaps rest and careful regimen for a few weeks may suffice for cure. But of the accomplishment of this we cannot be certain, until one or two menstrual periods have passed by without rekindling the symptoms. The signs of cure are: the cessation of febrile movement and of local pain; the moderation of discharge, the return of the os externum uteri to its ordinary calibre; the recovery by the vaginal-portion of its epithelium-investment; and the return of the mucous membrane to its natural pink colour.

Chronic endometritis, on the other hand, is a most obstinate disorder. It shows little disposition to spontaneous cure. Some observers, indeed, doubt whether it can even be cured by art. Scanzoni throws almost equal doubt upon the curability of chronic endometritis, that he does upon that of chronic metritis. Chronic catarrh, he urges, is the almost never-failing companion of chronic parenchymatous metritis, and how shall it be healed whilst the disorders of the circulation in the walls of the organ persist? How shall the hyperæmia, swelling, and hypersecretion of the mucous membrane disappear whilst the causative disorders in the wall of the uterus persist? I have already discussed the possibility of cure of parenchymatous metritis. If this possibility be admitted, then the possibility of curing endometritis follows as a corollary.

I cannot help attributing this eminent physician's unfavourable opinion, in some measure, to his imperfect estimate of the etiological importance of constriction of the os externum uteri, and of flexion. Treatment which fails to take cognizance of these conditions must necessarily be imperfect, and will therefore often fail.

The Treatment.—The indication to begin by removing any complication, such as flexion, inflammation of the vaginal-portion or cervix, or atresia, is obvious. Indeed, the principal remedies, those to be applied to the interior of the uterus, cannot be fairly brought into use until the cervical canal is made permeable for at least a No. 8 or No. 9 catheter.

Inflammation or engorgement of the cervix must be subdued by the methods already described. And when this is done, it will sometimes be found that the signs of endometritis have disappeared. Whether it be by derivation or by other agency, curing inflammation of the cervix will sometimes cure inflammation of the body too. But, although this is an essential part of the treatment, it ought not to be trusted to alone. For, if it occasionally is sufficient to cure, yet the process being indirect is slow and tedious. It is remarkable and gratifying to observe, in some cases, how quickly a long-standing case of endometritis is cured by direct treatment.

In the acute stage, which is most likely complicated with metritis proper, the application of twenty leeches to the hypogastrium, fomentations, sedatives, salines, will be necessary. In the chronic stage, the cure will depend greatly upon the judicious use of intra-uterine remedies. The solid nitrate of silver, which acts so well elsewhere, is of signal service in this case. The sulphate of zinc I have found almost equally beneficial; and it has the advantage of being safer. Tincture of iodine is perhaps the most effective and safe. Carbolic acid, chromic acid, chlorate of potash, perchloride and persulphate of iron, nitric acid, acetic acid, have all been extolled. These remedies are best applied either solid or in the form of ointment, or as liquid carried on swabs. The practice of injecting liquids into the uterine cavity offers no marked advantages over the methods described, and the attendant objections are so serious that it is desirable to discuss the subject of intra-uterine medication with special care.

THE VARIOUS MODES OF APPLYING REMEDIES TO THE INTERNAL SURFACE OF THE UTERUS.

The treatment of morbid conditions of the body of the uterus by *intra-uterine injections* is a subject that calls for earnest discussion on account of its utility and its dangers. If we treat morbid conditions of the eye, mouth, throat, larynx, bladder, rectum, and vagina by injections with such manifest advantage that we have come to look upon this method as in many cases indispensable, it seems reasonable to expect equal advantage from its action on the mucous membrane of the cavity of the uterus. Experience amply justifies this expectation. Topical applications to the diseased mucous membrane are in many cases essential to cure. But in the form of injected fluids they are not free from danger. Almost every author who has written upon the subject, refers to cases of accidents, ranging from severe pain to shock, collapse, metritis, perimetritis, and death. It is desirable to refer to some of these cases which best illustrate the conditions of danger.

Henry Bennet relates a case which occurred under Jobert. A girl, aged twenty-four, had a large fibroid of the uterus. Jobert made an astringent injection into the cavity of the neck. Almost immediately there arose shiverings, agonizing pains in the abdomen, then fever, then death in a few days from metro-peritonitis. Bennet performed the autopsy. He found nothing besides the marks of peritonitis.

The following history was supplied to me by Dr. Hermann, assistant obstetric physician to the London Hospital, and the account of the autopsy is by Dr. Sutton. A woman, aged forty-eight, had had six children and five abortions. For eighteen months she had suffered from menorrhagia. On admission there was decided retroflexion of the uterus. An injection of perchloride of iron, in the proportion of one part of the saturated solution to six of water, was used. About half a pint of this was injected through a double-channel catheter attached to a Higginson's syringe, the patient lying on her left side. The fluid appeared to flow out as fast as it entered. The catheter was kept half-rotated, so as to hold the uterus in its proper axis during the injection. The os uteri had been well dilated. Immediately after the operation the patient complained of intense pain in the abdomen. In the evening the pain was worse, and she had vomited. The pulse and temperature rose, and she died in collapse fifty-eight hours after the injection. In the peritoneal cavity was found a quantity of blackish-green opaque puriform fluid. Much of the peritoneum covering the intestines around the uterus was of a black colour. There was a quantity of pus in the pelvis. The left Fallopian tube was enlarged, and the vessels on its peritoneal surface highly injected. The outer half of the tube was much dilated, and filled with dirty, pus-like fluid. There was marked retroflexion of the uterus. Dr. Sutton's opinion was that the fatal peritonitis was caused by the iron solution escaping through the Fallopian tube into the peritoneal cavity,

Dr. V. Haselberg relates an instructive case.* A *puella publica*, having had an abortion six months before, came under treatment with anteflexion of the uterus to such an extent as to render the passage of the sound difficult. She suffered from profuse menorrhagia, and it was determined to try injection of perchloride of iron. It was only after repeated trials that the syringe was made to pass beyond the seat of flexion into the cavity of the uterus. The patient suffered no pain at the time, but at night had a severe rigor. On the fifth night rigor was accompanied by severe vomiting, and abdominal pains immediately ensued. On the following night this was repeated, whereupon she fainted and died. The intestines were found united by recent exudation. The lower parts of the pelvis were filled with stinking pus; the source of this was discovered in a cyst in the right ovary, which, through a small opening, gave issue to like matter. The right tube was permeable throughout its whole length by a large sound. The mucous membrane of the uterus was stained, as if with ink, and the same appearance extended along the right tube. The black patches showed iron by chemical tests. One fact, at least, is clear from this case—that perchloride of iron, like other fluids, may run along the Fallopian tubes. But it is not so obvious that the fatal result was due to this accident. No immediate symptoms followed the injection. The signs of intra-abdominal injury seem due to the perforation of the ovarian cyst under the pressure of vomiting.

In *Joulin's Journal* (1873) cases of mischief from injecting perchloride of iron into the non-pregnant uterus are cited. Iron was found in the peritoneum.

Hermann of Lourcine Hospital, relates the following :—A girl, aged nineteen, had profuse leucorrhœa. He injected a decoction of nut by a clysopompe into the uterus. At the first stroke she cried out, and put her hand to the left iliac region. Severe shivering set in, and lasted several hours; then febrile reaction followed. The pain spread to the abdomen, indicating metro-peritonitis. Hæmorrhage appeared in two days, and she was relieved.

It deserves notice that the intense pain called forth by applying various substances into the cavity of the uterus is most frequently of the nature of colic; it does not generally indicate metritis.

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* "Monatsschrift für Geburtskunde," 1869.

Metritis may, however, be caused if the substances used are caustic, as distinguished from styptic or astringent. This difference may depend upon the kind, the degree of concentration, and perhaps temperature of the agents employed.

The danger of fluids running along the Fallopian tubes seems to depend upon undue patency of these canals. This undue patency in its turn is owing in many cases, at least, to obstruction at some lower part of the utero-vaginal canal. Thus in V. Haselberg's case, and in the one at the London Hospital, there were decided flexion of the uterus and dilatation of the tubes.

It is not enough to know that patients occasionally die after injections are thrown into the uterine cavity—we want to know why they die. Knowing this, we may learn how to avoid the causes of danger, without abandoning the use of a mode of treatment which renders in many cases incontestable service.

Many experiments have been made on the dead body to ascertain the behaviour of injections. Hennig, Klemm, Guyon, Fontaine (*on puerperæ*), Alph. Guérin, Guichard, Scanzoni, and others have done this. The experiments generally show that there is extreme difficulty in making fluids run along the tubes, especially if the injecting syringe does not completely fill the os uteri internum. I will not relate or analyze these experiments, because they appear to me to be of little practical value. The conditions of the dead and of the living tissues are essentially different. For example, in the dead body there is no muscular contractility, no irritability under stimulus, no response of the nervous centres to peripheral injury. Yet these are conditions which come into play when injections are thrown into the living uterus. It may, indeed, seem at first sight that these experiments would at any rate illustrate the problem of the permeability of the Fallopian tubes. But, even here, their value is small. They may prove that great force is necessary to drive fluid along these canals; and that, unless the cavity of the uterus be closed below, as at the cervix, fluids will rather regurgitate than run onwards. But it is certain that in some of the cases where fluid injected into the living uterus ran along the tubes, the accident could not be accounted for by the very small amount of injecting-force employed. Another power, therefore, must have been in action and this could be no other than that exerted by the uterus itself contracting spasmodically upon the irritating fluid thrown into it. This force, the lower or cervical orifice of the uterus being closed, would pump the fluid onwards into the tubes.

J. Whitehead, in a valuable practical paper (*Brit. Med. Journal*, 1873), suggests that fluids may be carried onward into the peritoneum by capillary or ciliary action. He prefers the use of solid or unctuous substances.

Again, it is not necessary for the production of alarming or even fatal accidents, that the fluid should run along the tubes. The fluid injected into the cavity of the uterus may cause metritis, and the inflammation may spread to the adnexa and to the peritoneum. Or severe pain, shock and collapse may be the immediate and simple result of the irritation produced on the uterine superficies by the contact and retention of the fluid. The agony attending some cases of dysmenorrhœa is simply due to the irritation set up by retained blood causing uterine contractions or colics. The pain, the prostration, the other nervous phenomena attending dysmenorrhœa are sometimes as severe as those attending intra-uterine injections.

In some unfortunate cases, as in one related by Tissier, the fluid injected has been, not simply of styptic and coagulating power, but actually caustic. It ought to be needless to point out so fundamental an error. But it has been committed more than once; and the fault of the operator has been assigned to the method.

It is not even necessary that fluids should be injected into the uterus at all. I have seen pain and collapse so severe as to cause the utmost anxiety for the result, follow an ordinary injection of weak sulphate of zinc into the vagina. This occurred in the case of a lady, whose maid was administering, as she had often done before, a zinc solution, by means of a Higginson's syringe. The cervix in this case was patulous, but it is certain that the pipe of the syringe was not inserted into it. She recovered in some hours, no inflammation supervening.

It will further be remembered that the mere touch of a sound or bougie against the fundus uteri will in some cases produce severe pain, and even prostration.

Again, symptoms resembling in character and severity those caused by injected fluids, are occasionally observed when solid or unctuous substances are used, which cannot from their nature flow along the tubes, which must, in short, act *in loco.*

Thus, Aran says he has known three cases of fatal peritonitis from actual cauterization of the os uteri, and one case of fatal ovaritis from the application of Vienna paste.

I have known the most severe pain and prostration followed by hæmorrhage and metritis, caused by the application of solid nitrate of silver to the interior of the uterus; and I have seen fatal metritis and peritonitis follow the simple application of nitrate of silver to the cervix uteri.

The severity of the accidents is not always explained by the nature of the fluids injected. Alarming symptoms have followed the use of comparatively weak solutions. It has been supposed in these and other cases that the untoward phenomena were due to the forcible propulsion of air along with the fluid. In some cases this hypothesis may be well founded. But I think its importance has been exaggerated. It is even doubtful whether a quantity of air at all calculated to produce serious distress can be driven into the vessels or tissues of the unimpregnated uterus; and the small quantity that might possibly run along the Fallopian tubes into the peritoneal cavity could hardly do much harm.

One all-important caution is to be religiously observed, namely, *never to use any topical application to the uterus or vagina, or to perform any surgical operation upon the uterus, when a menstrual period is impending or present.*

It is at this time when the menstrual flux is imminent, when the nervous system is at its acme of excitability, that even slight causes are sufficient to light up acute inflammation. At this time, it may be said, the uterus resents all interference.

Dr. Cohnstein gives* a careful historical survey of the practice and opinions of those who have related their experience upon this subject. The general conclusion arrived at is that injection of very powerful caustics is likely to cause inflammation of the uterus and peritoneum, or severe prostration and uterine colics; and that these dangers are less urgent if care be taken first to dilate the cervix.

Dr. Lente† discusses this question, passing under review the various topical methods of treating disease of the cavity of the uterus. Iodine in solution he has known cause intense pain and alarming collapse, which, however, passed away, no further bad effect ensuing.

The leading gynæcologists of New York have also discussed this question. Instances of serious accidents were adduced. The general opinion seemed adverse to the use of intra-uterine injections, whilst Dr. Thomas was especially emphatic in his condemnation.

To avoid the dangers of intra-uterine injections, several precepts have been enjoined. The great object aimed at is to avoid or lessen the risk of the fluid running along the tubes. This it is sought to attain—

1st. By securing free dilatation of the cervix uteri before injecting, so that the fluid may readily run back into the vagina. For this purpose the preliminary use of laminaria-tents is advised.

2nd. To secure against narrowing of any part of the uterine canal by flexion or angulation.

3rd. By using only graduated quantities of fluids, and injecting very gently and slowly.

4th. By using a double canula, so as to secure a return-current. To effect this the more surely, the openings of the canulæ at the uterine end are made at different levels.

I have not much faith in the double canula. The end which should serve for the return-current is liable to be choked. The preliminary free dilatation of the cervix and the use of gentleness in propelling the fluid should never be omitted. But I do not believe that the observance of these precautions is an absolute guarantee against accidents. It is probable that the mere forcible impact of any fluid striking upon the inner surface of the uterus, especially upon the fundus, may cause severe pain and prostration. Since nothing is gained by forcible injection, this consideration affords additional reason for injecting with all possible gentleness. Hence, it is well to use injecting-pipes having lateral openings of very fine calibre, so as to "pulverize" the liquid. I strongly advise not to use injections at all in cases of marked flexion of the uterus. Even if we dilate the cervix first by tents, and maintain the uterus erect during the injection, we cannot always be sure that the flexion will not be reproduced, so as to prevent the issue of the fluid; and it must not be forgotten that it is especially in these cases that the uterine cavity is likely to be enlarged, and the Fallopian tubes dilated.

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* "Beiträge zu Chronischen Metritis," 1868.

† "New York Journal of Medicine," 1870.

The general conclusion at which I have arrived is to restrict the use of intra-uterine injections within the narrowest limits. I rarely employ them now, except in cases of urgent danger from metrorrhagia.

Danger of Vaginal Injections.—It must not be lost sight of, that even vaginal injections are not free from danger. Lorain (*Gazette des Hôpitaux,* 1873) relates the case of a girl suffering from gonorrhœal vaginitis, who used an injection of a small quantity of a weak solution of nitrate of silver. It was made slowly, and with a glass syringe. This was followed by acute pain, rise of temperature, and vomiting. She mended sensibly for two or three days, but died suddenly on the fourth day. No tympanites. Suppurative inflammation was found on the mucous membrane of the uterus. The Fallopian tubes were filled with pus; pus was also found in the peritoneal cavity, and there was diffuse peritonitis.

Lorain cites cases in which exploration or simple cauterization of the cervix has caused death, from Bourdel and Martin César, Dolbeau, Béhier, and Letecuterier; and from Jobert, one in which death followed the actual cautery to the os externum. Lorain adopts the view already expressed, that the danger arises from the contractile action of the Fallopian tubes and uterus, and the nervous excitability of the ovario-tubo-uterine system. The injection plays but a minor part. In the particular case related by him it is probable that death was caused by the spasmodic contraction of the uterus and tubes driving the foul pus in them into the peritoneum. The nitrate of silver injection merely excited this contraction.

We may obtain almost all the advantages that injections are capable of giving by other means. For example, the same agents which are so useful in the form of solutions for injection, may be applied either by swabbing, or solid, or in the form of ointment. Thus, where the use of chromic or nitric acid, perchloride of iron, iodine, or bromine is indicated, these agents can be applied soaked on a sponge or piece of cotton, or on a glass or hair pencil, having previously well dilated the cervix. Nitrate of silver is far better applied in the solid form. Even then it is liable to cause severe colic. The risk of this may be lessened by reducing the caustic by fusing it with equal parts of nitrate of potash.

The ordinary way of using the solid nitrate of silver, that is, by holding a piece of the stick in a forceps or porte-crayon, is objectionable. The piece may fall out or break, and a fragment left behind in the cervix or body of the uterus may give rise to intense agony, hæmorrhage, and even metritis. To avoid this accident I have for many years used the contrivance figured p. 162 (Fig. 50). This is far the best way of applying nitrate of silver to the os and cervix uteri, and it is the only safe way of applying it to the interior of the uterine cavity. The armed end of a probe may be passed into the uterus without the speculum, although the aid of this instrument is sometimes convenient. For example, unless the armed probe is protected by a canula, the caustic will first touch the vulva and vagina in its passage, which is apt to have unpleasant effects, and the guiding finger of the operator will be stained.

A very useful topical application to the mucous membrane of the cervix and body of the uterus is sulphate of zinc. The value of this agent, when applied to the relaxed or morbid mucous membrane is familiarly known. How to apply it to the uterine mucous membrane is therefore a matter of great interest. A solid stick of two or three grains can be carried quite into the uterus without having touched the vagina by the way by means of my canula (Fig. 51, p. 162), now generally sold by instrument makers.

It is a great advantage of this contrivance that the use of the speculum is quite unnecessary after it has aided in establishing the diagnosis which supplies the indication in treatment. When the instrument has gone the proper depth, the piston pushes out the stick, and the instrument is withdrawn, leaving the stick to dissolve. This it soon begins to do, and by its speedy effect in constringing the mucous membrane, it keeps itself *in sitû* until it is completely dissolved.

Nitrate of silver reduced by admixture with nitrate of potash may be used in the same way. So may persulphate of iron, but this should be considerably reduced. When used nearly pure I have known it cause severe colic and bleeding,

A most precious way of applying astringents, caustics, solvents, or alteratives to the interior of the uterus, is in the form of ointment or pasma. In this way almost any substance may be applied. Where grease is objectionable as a vehicle, a pasma of suitable consistence may be made by glycerine, vaseline, or other substances. In this form we may use remedies which cannot easily be applied in any other way. For example, we can hardly use bromine, or iodine, or mercury in a solid shape; and to use them in the liquid form is open to the objections already discussed. Almost anything can be made into an ointment or pasma; and we thus get a complete practical command over a large range of useful agents.

When the object is to pass liquids as nitric acid, or *tincture of iodine directly into the cavity of the uterus,* without touching the vagina or cavity of the cervix by the way, the best plan is to use the piston-catheter above described. This can be done without the speculum; a very great advantage, since it is almost always much easier to pass a sound or tube into the uterus under the guidance and aid of a finger. But where a slight contact of the fluid with the passages on the way is of little moment—and this applies to tincture of iodine—a readier way is to twist a bit of cotton-wool on the roughened probe (Fig. 50), and having charged it by soaking in the fluid, to pass it into the uterus, under the guidance of a finger on the os externum. If properly twisted on the probe there is no fear of leaving the cotton-wool behind. The instrument now known as Playfair's probe is an adaptation of the one referred to.

To introduce ointment into the cavity of the uterus, the instrument figured at p. 164, Fig 52, is both convenient and effective. It is used without aid of the speculum. It is charged by dipping the end into the ointment. This carries a sufficient quantity into the uterus, when, by pushing home the piston, the ointment is deposited there.

Vaginal lotions of tannin, sulphate of zinc, acetate of lead, or alum, render important aid. There is often some complication of chronic inflammation of the fundus of the vagina, with ulceration; and it is useful to remedy this condition. This is the more important since the patient can herself keep up this treatment. A useful mode of medication applicable to the vagina is to wrap about twenty grains of alum in powder in a pledget of cotton-wool; and to insert this in the vagina daily or every other day. This contrivance acts in two ways; first, there is the astringent, corrective action of the alum gradually acting as the powder melts down; and, secondly, the cotton plug acts by keeping the irritable vaginal walls from contact and friction. It secures "rest." Sometimes, however, plugs act as foreign bodies, cause irritation, and are not tolerated. They should not be allowed to remain more than four hours. They can be applied by help of the plug-speculum figured at page 166.

The fuming nitric acid is highly extolled by Dr. Lombe Atthill.* He advises first local blood-letting by scarification. Then he proceeds to the swabbing the interior of the uterine cavity with strong nitric acid. In order to secure its due application, he dilates the cervix uteri with a faggot of laminaria-tents; then he introduces an intra-uterine speculum, which makes a channel, protecting the cervix, through which the charged swab can be carried direct to the fundus of the uterus. The uterus is drawn down and steadied by seizing the os uteri with a vulsellum. Dr. Kidd, Dr. Ringland, Dr. Evory Kennedy, Dr. J. A. Byrne, all speak highly of the efficacy and safety of this method. For my own part, I feel compelled to repeat that experience has amply proved that the dilatation by tents of the cervix uteri, howsoever necessary it may be in some cases, is almost invariably a painful, and sometimes a dangerous proceeding, and that in the cases where nitric acid is likely to be useful, the canal will generally be patent enough without artificial dilatation. The action of the nitric acid itself, I know, is useful, and as safe as most other agents.

Constitutional treatment of Endometritis should not be neglected. In the acuter stages salines and sedatives, with a bland unstimulating diet, should be given. In the stages of debility, when nutrition has become impaired, and when the nervous centres have suffered from long-continued impressions of pain, and the wear and tear of illness, neuralgia, in one or more of its numerous forms, is almost sure to be developed. Remedies presumedly directed *ad hoc,* constantly fail, unless, indeed, the exhausting disease, the endometritis, be cured. But still, the use of tonics and other remedies calculated to improve nutrition, to procure ease from pain, to regulate the secretions, should go on *pari passu.*

Copaiva, which may be given in the form of capsules, appears to possess some virtue in restraining secretion from the mucous membrane of the uterus, although it is less to be depended upon than in the case of the lungs or bladder. Ergot and digitalis are also at times useful; quinine, bark, and strychnine, I think, are even more so.

Purgatives become of essential importance. Saline aperients, aloes, an occasional mercurial alterative, generally combined with belladonna, give the best results. Aran speaks highly of aloetic enemata. Indeed, no indication is of more general application than that of keeping the rectum free from accumulation.

Exercise should be regulated by the patient's strength, and her liability to pain. A sense of weight, of oppression, of pain, in the pelvis, extending down the legs, should be taken as a warning to rest. Hip-baths and the consequent friction bring some of the benefits of exercise.

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* "Dublin Medical Journal," January, 1873.

When the active symptoms have been subdued by local treatment, the stimulating saline, sulphur or iron waters will be useful in confirming the cure. Hip-baths of plain cold water, combined with vaginal irrigation, often render great service. But in most cases warm baths are safer and more useful.

There is *a form of inflammation of the cervix,* chiefly limited to the mucous membrane, unconnected with pregnancy, which may also be called *traumatic.* It is the result of undue or awkward sexual intercourse, associated or not with infection or local poisoning. Although most frequent in young married women, I have seen a similar condition independent of sexual intercourse. In some of these the cause was obscure; in others the disease ensued upon cold or violent exertion. The patient complains of pain, more or less acute, in the centre of the pelvis, radiating to the hypogastrium and groins. She stoops in walking, in order to relieve the pain. Any exertion quickly induces such pain and exhaustion that she is compelled to rest. There is often some degree of constitutional irritation and disturbance of the function of the stomach. Sometimes there is leucorrhœa; but often the reply to questions upon this point is in the negative. On examination, it may be found that there is a copious accumulation of muco-puriform matter in the fundus of the vagina, where it lodges, being retained there as in a sac by the contraction of the vagina below. Such a collection may be voided unconsciously during defæcation. The rugæ are prominent, angry-red; copious, epithelial secretion is found between the rugæ, and viscid glairy secretion is seen oozing from the cervix uteri. The membrane covering the vaginal-portion of the cervix may be smooth, or may present spots of epithelial abrasion; but it is in either case intensely red, injected, and somewhat swollen. This form of disease not uncommonly induces vaginismus. Dyspareunia is often very marked. The treatment consists in "rest." Injections of lead are especially useful. In aggravated cases, especially those marked by vaginismus, the vaginal-rest, or a cotton wool plug soaked in glycerine, renewed daily, will be of essential service, and will greatly shorten the period of treatment.

One form of endometritis leads to exfoliation in mass of the mucous membrane. This constitutes the *dysmenorrhœa membranacea,* which has been described in Chapter VIII. In some cases of this kind I have known inflammation affect the mucous membrane of the cervix, as well as of the body. The epithelium of the os uteri, and presumably that of the cervical canal as well, being thrown off, leaving a pseudo-ulcerated or denuded surface, although there had been no labour.

If there be a *tubercular diathesis* the case is more troublesome still, probably incurable; for tuberculization is rarely limited to the uterus.

The *syphilitic* taint is commonly acquired through the gestation of a diseased ovum, and often first becomes manifest after the birth of a child, at times showing marks of the disease, or, more frequently, after the premature birth of a dead child, or after an abortion.

The syphilized mucous membrane is thickened—constantly tending to rapid superficial decay; and its regeneration is imperfect. The taint remains, as in the skin, for an indefinite time. Such a mucous membrane is unfitted to develope a healthy decidua, and yet it is not a bar to impregnation. Hence conception after conception issues in abortion; and every time the new mucous membrane is reformed with the same characters. It may lead to protracted retention of placental remains after abortion as well as after labour at term, and greatly disposes to sub-involution. More or less chronic engorgement or inflammation of the body of the uterus commonly attends. Unlike the tubercular diathesis, the syphilitic commonly affects the cervix as well as the body of the uterus.

There is always hyperæmia, sometimes chronic inflammation; and the menstrual disposition is towards excess in loss. The appearance of the vaginal-portion has struck me in many cases as being peculiar, so that I have thought I could recognize the syphilitic complication by the sight. But in practice we are not often obliged to trust exclusively to the local symptoms. It is rare that the history and the presence of symptoms in various parts of the body do not reveal the nature of the case. Gummata about the vulva and anus, sore throat, fissured or ulcerated tongue, characteristic eruptions on the skin, falling of the hair, will generally be found.

Leucorrhœa, the discharge being often more offensive than usual, is a constant symptom.

The *treatment* must obviously be both constitutional and local. Iodide of potassium, occasionally iodide of mercury, bark, should be persisted in for several months. A cure cannot be effected in a few weeks. The calomel vapour bath of Henry Lee is an excellent remedy. Baths of Vichy salts, or better still, the internal and external use of bromo-iodic waters, as those of the Woodhall Spa, Kreuznach, Carlsbad, or Wiesbaden, will render eminent service.

The best local remedies are the iodide of lead or iodide of mercury ointment applied inside the uterine cavity. The direct contact with the diseased mucous membrane I have found especially beneficial. Sometimes the part may be touched with solid nitrate of silver, or a small stick of sulphate of zinc may be inserted. The applications should be made every fourth or fifth day between the menstrual epochs.

The local treatment may be partly carried on by the patient herself. Sulphate of zinc injections daily will be of service, although they touch the vagina and vaginal-portion only.

Should pregnancy occur, and it is to be deprecated until the mucous membrane shall have recovered its soundness, the local treatment must be stopped. But the constitutional remedies should be sedulously persisted in. We may usefully combine with the iodide of potassium five or ten grain doses of chlorate of potash. In this way abortion is sometimes averted.

Growths or excrescences vary according as they are developed from the mucous membrane of the cavity of the uterus, cervix, or vaginal-portion.

1st. The growths in the mucous membrane of the body occur in the form of circumscribed elevations, two or three lines thick, in flat *plaques,* the surface of the mucous membrane being tumefied by catarrh. These puffed elevations are red, shiny, velvety, smooth. On scraping them a milky fluid exudes, which under the microscope exhibits glandular epithelium, sometimes transparent vesicles and colloid bodies. Specimens hardened in chromic acid, and thin slices treated with glycerine, exhibit areolar stroma of connective tissue with utricular glands, partly enlarged, partly obliterated. The vascularity of these growths is sometimes extraordinary. Sometimes with the naked eye one can see yellowish white dots which under the miscroscope are recognized as obliterated glands with fatty degeneration of epithelium. In other cases small vesicles are visible in these tumours, resulting from constriction, and cystic degeneration of the utricular glands. This latter forms the transition from these tumours to vesicular polypi of the uterus. They vary in size from one inch to more in diameter.

The sub-mucous uterine tissue becomes hypertrophied into connective-tissue outgrowths *(sarcomata),* which gradually form the so-called *fibrous-polypi,* in whose interior are often contained separated portions of elongated uterine glands, or gland-tubes, of new formation, which degenerate into cysts *(cysto-sarcoma adenoides).*

Sometimes the uterine mucous membrane degenerates into a more or less hard, richly-nucleated, fibrillous, callous, connective-tissue substratum, in which the glands have shrunk away. Often it is studded with small cysts, containing mucus or colloid, the remains of the separated portions of the uterine glands.

CYSTIC ENDOMETRITIS; CIRCUMSCRIBED PROLIFERATION OF THE UTERINE MUCOUS MEMBRANE, VESICULAR POLYPI.

The development of cystic tumours at the cervical orifice out of obstructed glands is not uncommon. It is less frequent in the cavity of the uterus, but still it is occasionally observed as a result of chronic endometritis. The utricular follicles may, as we have seen, be greatly hypertrophied. They may be seen as small rounded tumours, projecting as hemispheres, or sometimes pedunculated; their walls are transparent; they feel like little resisting grains, slightly elastic. They range from the size of a pin's head to that of a small nut. They contain a transparent liquid. They are often associated with the so-called fungosities, granulations, or vegetations. Ch. Robin has shown that these bodies are formed of exactly the normal elements of the uterine mucous membrane. There is a disposition to fatty degeneration at their base.

In some rare cases the elongation of the uterine glands takes place in both directions, that is, into the uterine cavity on the one hand, and into the uterine parenchyma on the other.

These little cystic growths sometimes form a cluster, hanging round the upper end of the cervical canal, near the os internum; or may be more or less isolated; or they may occur in groups or singly, near the os externum. When they form in the cervix the os externum is usually patulous, and the finger passed into the cavity feels them as rough projections, or as soft pedunculated bodies rolling under the finger. Sometimes, as in a case figured by Lancereaux, these cervical cystic growths are associated with a similar formation in the body of the uterus. In this case the enlarged uterus contained a thick viscid fluid; its mucous membrane was red, injected, had at its fundus a mammellated mass, greyish, formed of vascular connective tissue, in which were found multiple cavities filled with clear serosity. Sometimes a group will form a distinct polypoid outgrowth. Of this there is a striking example in the museum of St. Thomas's Hospital.

These changes of the mucous membrane probably include some of the most difficult pathological and therapeutical problems. The "fungosities," "carnosities," "excrescences," so often associated with some degree of enlargement of the body of the uterus, attended by hæmorrhage, and inducing cachexia, not seldom, by their obstinacy and other characters, simulate malignant disease. Sometimes, indeed, there is good reason to believe that the endometritis is dependent upon, and modified by, a tubercular or cancerous complication. But even apart from such complication, the changes of structure resulting from long-standing slow congestion or inflammation are exceedingly troublesome.

They may sometimes be distinguished from the malignant disease which attacks the lining membrane of the uterus after the menopause by this circumstance: if there have been a distinct interval after the menopause, marked by absence of blood-discharge, then the sudden appearance of hæmorrhages is strongly presumptive of the rise of malignant disease. Forming sessile or pedunculated tumours, they resemble, and sometimes may be, early papillary epithelioma. But where during the latter years there has been persistent menorrhagia, followed by hæmorrhages more or less periodical, without any prolonged break to mark the cessation of ovarian life, although the insidious invasion of malignant disease may be possible, the presumption is greater in favour of chronic inflammatory change in the mucous membrane.

Whether malignant or benign, a symptom which cannot be overlooked any more than the hæmorrhage is almost constant, that is, severe pain. This I have found, both when the growths were in the cervix and when they were in the proper cavity of the uterus.

The bleeding is often profuse to the extent, by its quantity and frequent recurrence, of endangering life. When the seat of the disease is the cervix the blood is sometimes bright arterial; when the seat is in the body of the uterus, and the blood is liable to temporary or partial retention, it may be darker, even black.

This gradual rise of the affection towards the advent of the menopause, and its comparatively rare occurrence at an earlier age, supply evidence of its slow development out of chronic inflammation.

They are not uncommonly associated with fibrous tumours or polypi in the body of the uterus, as may be seen in illustrations in the chapter on those affections.

As already said, the body of the uterus is almost invariably enlarged; its walls are thickened. This commonly induces some signs of prolapsus, but flexion is by no means a necessary concomitant. I think I have more frequently observed anteversion. The enlargement of the womb is the result of slow hyperplastic process. There is generally a degree of softness of structure. Increased vascularity or congestion, aggravated by ovarian stimulus, leads to menorrhagia, now and then amounting to alarming flooding. Dyspareunia commonly attends, and intercourse is sometimes the exciting cause of hæmorrhage. The uterus is found by touch to be increased in bulk and weight, and to be unusually sensitive. The sound will often cause bleeding, and more pain than is usual. The speculum shows tumefaction and vascularity of the vaginal-portion, and a patulous state of the cervical canal, and blood or mucus issuing from the uterus.

The systemic symptoms are the expression mainly of the losses of blood, and of the impairment of the functions of nutrition and innervation, consequent on anæmia and local irritation. This exhaustion and the attendant pain will commonly give the patient a peculiar, worn, haggard expression of countenance.

The first indication in *treatment* is usually the urgent one to arrest bleeding. To carry this out the most effectual means are the topical application of perchloride or persulphate of iron in styptic strength, or rather fuming nitric acid, or tincture of iodine. These agents may be carried into the uterine cavity on a sponge or cotton-wool, mounted on a whalebone probang, or on a glass pencil, through a speculum, if the canal of the cervix is open and straight enough; or better still, by the fenestrated tube. In the contrary case it may be necessary first of all to dilate the cervix by sponge or laminaria tents. Indeed, the rule laid down in the chapter on "Hæmorrhages" to "obtain and maintain free patency of the cervical canal" applies strictly to this case. So true is this, that in many cases the mere artificial dilatation will check the hæmorrhage. Dr. Routh * even affirms that the action of "the sponge-tent itself suffices to cause absorption and diminution of volume of the uterus."

When the hæmorrhage has been checked, tonics, as strychnine, quinine, ergot, will be useful. The diet should be light; stimulants should be sparingly given.

The introduction into the cavity of the uterus, every fourth or fifth day, of solid sulphate of zinc, nitrate of silver solid or in strong solution, of tincture of iodine, or of iodide of mercury in ointment or pasma, will render eminent service.

In obstinate cases, where topical applications fail, the expediency of removing the diseased tissue must be considered. It was in such cases that Récamier practised the operation of *scraping off the excrescent fungosities* by a *curette*. The proceeding seems a bold one, even rough; but the condition of the patient is serious. Undoubtedly women have been rescued by it from imminent danger. In this affection, as in undoubted malignant disease, it is the surface, the papillary projections, which are the immediate source of the bleedings. When the superficial stratum is removed, the bleeding is usually arrested for a time.

Fig. 104 represents Marion Sims's curette, which I have found a very convenient instrument. It has two sizes, one at either end of a stem, about ten inches long.

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* "Cases of Menorrhagia treated by Injection, or the Removal of the Uterine Mucous Membrane by the Gouge." By C. H. F. Routh, M.D., "Obstetrical Trans.," vol. ii.

Fig. 105 represents Récamier's curette. The two forms may be conveniently united in one instrument, so that either end may be used. The curette held in the right hand is passed into the body of the uterus, guided by a finger of the left hand applied to the os uteri, the fundus being supported by the hand of an assistant above the symphysis. The subacute edge of the curette is then drawn over the entire internal surface, so as to break down and detach any projecting masses. Sometimes small pisiform or pyriform bodies, like minute vascular or mucous polypi, are brought away. By injecting a light stream of water these bodies will be washed out, and may be collected for examination. It is not generally necessary to apply anything to the surface after the curette has done its work. But there is better security against bleeding, and probably useful modifying action, if the surface be mopped with tincture of iodine, nitric or carbolic acid.

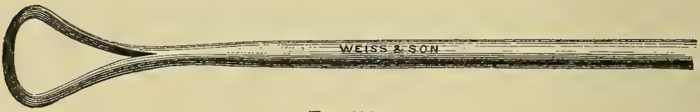

Fig. 104.

MARION SIMS'S CURETTE.

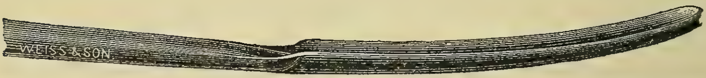

Fig. 105.

RÉCAMIER'S CURETTE.

Absolute rest is essential. Metritis may follow. The operation should not be resorted to except when milder proceedings have failed to relieve urgent symptoms. Occasions arise when timidity on the part of the surgeon will seal the patient's fate; and when his duty is calmly to balance the dangers of expectancy, and those of resort to even a doubtful remedy.

After this decisive course of action we have reason to hope that a healthier mucous membrane will be produced. But the truth must be admitted that the disease is apt to return. This, however, may not happen for several months; and during this time the patient may suffer little from hæmorrhage or other trouble. During this period of intermission, much may be done to bring down the chronic congestion and tumefaction of the uterus. Strychnine, quinine, iodide of potassium, even iodide of mercury will be useful. And, internally, the application of iodine, or of iodide of mercury, or of nitric acid will prove serviceable.

Senile Uterine Catarrh.—This disease has been adverted to when discussing atresia. It deserves separate consideration, on account of its frequency and importance. It probably, in most cases, is continuous from chronic metritis acquired before the menopause. Notwithstanding the disposition to uterine senile involution or atrophy, a change which, in some cases, may terminate that vascular activity upon which inflammation and even secretion depend, a degree of morbid action is often perpetuated. The pelvic vessels often continue engorged after the menopause from impeded hepatic circulation. The uterus in these cases will remain unduly congested, and the slow chronic inflammatory process is easily fed.

This condition will account for the occasional apparent return of the menstrual discharge several months after the function had been supposed to have ceased. This is one form of senile uterine hæmorrhage. In other cases there is not so much vascular fulness; yet the mucous membrane continues to throw off a more or less abundant thin opaque mucous secretion. The walls of the uterus are usually somewhat thicker than usual. Atrophy, in fact, has been arrested. The cavity is almost always enlarged. The sound readily turns round in it. The flaccid condition of the uterus disposes to flexion, most frequently to retroflexion; although it is certain that in many cases the flexion existed before, and may have been the cause of the endometritis. When this occurs there will of course be more or less retention of mucosities in the uterus. And it is to this retention that some of the most marked symptoms are due. It brings about a sense of fulness; weight and oppression, with pain in the pelvis. The constant wear and tear tells upon the nervous system and upon general nutrition. The most distressing nervous symptoms, despondency being the most characteristic, are often produced. The quantity of the discharge is at times also great enough to make a serious drain.

In a considerable number of cases I have found complete, or nearly complete, closure of the cervical canal, generally at either the os externum or os internum. The walls have grown together by a process compounded of inflammation and atrophy. (See Fig. 98, p. 472.) But the uterine cavity continuing to secrete, the secreted fluids accumulate, and thus retention and its consequences ensue. Expulsive pains are felt, which generally subside, to be renewed at variable intervals. In some cases, the aged uterus, not receiving the stimulus of menstruation, and but feebly responding to other stimulus, accommodates itself to the distension. Atrophy progressing, the fluid part of the mucus may disappear, or be retained without causing further trouble. But in other cases, and those, if I may judge from my own experience, not a few, the distress does not subside. Advice is sought on account of the pelvic suffering, or metrorrhagia. Then we find the roof of the vagina contracted into a cone, at the apex of which is a small depression, recognized as the os uteri. There may be little or no projecting vaginal-portion. Behind this depression we may feel the retroflected body of the uterus; or this part may be in natural position. On trying to pass the sound we find it soon meets with an obstruction. The os externum is occluded. Sometimes a little steady pressure with the point of the sound will penetrate the obstruction. But I have several times found it necessary to restore the cervical canal by incision or puncture. For this purpose a most convenient instrument is the sheathed male urethral stricture bistoury, or the modification of it, designed by me for gynæcological purposes. This done, an ounce or more of muco-purulent fluid has escaped with manifest relief. To prevent relapse it is necessary now and then to pass the uterine sound; and to correct the morbid state of the cavity to introduce a stick of sulphate of zinc, or to swab with tincture of iodine, or nitrate of silver, every three or four days. By this treatment a cure is commonly effected in a few weeks. The atrophic process goes on undisturbed.

In chronic internal metritis, especially in elderly women, Aran advises the use of the hollow sound or catheter, as a means of diagnosis. The retained mucous fluids are thus drawn off, and their quality and quantity may be estimated. We may use a male silver or elastic catheter, but the curve must be moderate. The ointment-carrier (Fig. 52, p. 164) answers the purpose. Dr. Charles Hennig lent to the Obstetrical Society's Exhibition an aspirator-tube designed to draw out fluids from the uterus.

The following remarks apply generally to the treatment of chronic endometritis. The exhaustion wrought by disordered nutrition may, there is great reason to believe, in some instances end in the development of tubercular mischief in the lungs. This is not surprising, when we remember that a strumous or lymphatic diathesis is a very powerful factor in producing and in giving the stamp of obstinacy to chronic metritis.

In some cases marked by peculiar obstinacy there is indeed a tubercular condition of the uterine mucous membrane. For this I doubt if there is any cure. To pursue local treatment in such cases, beyond perhaps applying an occasional detergent or disinfectant, would be to inflict needless distress. It must also become a question how far, when lung mischief has become revealed, it is desirable to persist in treating the uterine catarrh. It should not I think be always given up. The principle of curing as far as we can, every component part in a chain of morbid complication obtains here. But often it will be found the most judicious course to abandon local treatment, and to address all our care to the general system, and the alleviation of the lung-distress.

Anomalies of Consistency.— One of the most remarkable is the *pulpiness* of advanced age, coming on after long-continued mucous secretions, which disposes to ecchymosis or uterine apoplexy. Another form of softening is that ensuing upon childbearing, when involution is arrested by marasmus. The mucous membrane may also become soft from repeated hæmorrhage. From constant infiltration or maceration it swells and disintegrates.

Abnormal hardness of the uterus affects chiefly the vaginal-portion in consequence of the predominance of connective tissue in hypertrophy.

Lesions of Continuity of the Uterus.—Lacerations may occur in the non-pregnant uterus. I have carefully described the lacerations of the pregnant uterus in my *Lectures on Obstetric Operations,* 3rd edition, 1876. Under excessive distension from collections of blood or mucus, laceration or perforation has occurred. The uterus also has ruptured from the pressure of a polypus in its cavity.

The *tumours* of the uterus will be described in a separate chapter.

CHAPTER XX.

PELVIC CELLULITIS (PARAMETRITIS): PELVIC PERITONITIS (PERIMETRITIS): GENERAL DISCUSSION ON PATHOLOGY AND CAUSES; PERIMETRIC INFLAMMATION (PERI-UTERINE INFLAMMATION); METRO-PERITONITIS.

The subject of inflammation of the pelvic tissues connected with the uterus and its appendages has been worked out, of late years, with great clinical skill; and, I may venture to add, with superfluous critical acumen. There is a natural tendency to embody or condense the new views we arrive at as to an essential pathological condition, by assigning to this condition a new name. If this name be tolerably precise and descriptive, it is often readily accepted as the last expression of science. Hence a name is apt to impose upon the learner the belief that he has caught the true clinical idea. And then, in accordance with another tendency, the mind, satisfied with the seeming fulness of the idea embodied in a new term, proceeds to eject every other term hitherto associated with the condition under discussion as false. Unable to entertain two ideas at the same time, hastily concluding that one or the other must be false, the one which is presented in the most attractive or authoritative manner is accepted, to the absolute exclusion of the other.

This reflexion is remarkably illustrated in the history and varying nomenclature of inflammations of the pelvic structures. These inflammations of course remain, or continue to be reproduced, as they always have been. New names may represent new theories, but the clinical facts are unchanged. It is these which it is important to understand. It is to be feared that new names have tended rather to obscure these facts than to elucidate them. In attaching too much importance to names, that is, in allowing the mind to be dominated by the theories that names represent, we are apt to lose sight of the truth which lies in the rival names and theories. A true theory and a false theory are antagonistic. If we accept the one we must, logically, reject the other. But there is no antagonism between two true theories. These must be reconcilable, however widely observation and reasoning carried on in different lines may place them in opposition.

I will now endeavour to state the case plainly, divested of all theory or school-doctrine. All the structures in the pelvis are liable to inflammation. It is conceivable, and true in fact, that any one of them may be alone the seat of inflammation. It is conceivable, and true, that two or more of them may be inflamed together. We have already endeavoured to trace the history of inflammation of the ovaries, Fallopian tubes, and uterus. It remains to fill up the account by tracing the history of inflammation of the other adjoining structures. What are these structures ? We are not called upon in this place to consider inflammation of the rectum, bladder, or vagina, otherwise than incidentally. The structures with which we are now concerned are the cellular or connective tissue, the peritoneum, and the broad ligaments. No one disputes that each of these structures may be the principal focus of inflammation. For example, however we may cavil at the term "pelvic cellulitis," we cannot deny that the pelvic cellular tissue, that is, the connective tissue in relation with the uterus and broad ligaments, is liable to inflammation. Paris, Frarier, Courty,* E. Simon, Alph. Guérin, each relates cases of distinct pelvic cellulitis. "Pelvic cellulitis" expresses this fact, and nothing more. Again, however we may cavil at the term "pelvic peritonitis," we cannot deny that the peritoneum which invests the organs in the pelvis is liable to inflammation. "Pelvic peritonitis," then, is a good term, as expressing this fact. So again, at the bedside we are often called upon to speak of inflammation of the broad ligaments. When we so speak we do not pretend to define rigorously which of the constituents of the broad ligaments—connective tissue, vessels, muscular fibres, or peritoneum—is especially the seat of inflammation. Although undoubtedly inflammation may *begin* in the vessels, or in the connective tissue, or in the peritoneum, we shall rarely find an instance in which inflammation does not involve the proximate tissues more or less. We are therefore generally compelled to speak of inflammation of the broad ligaments in the aggregate. It is scarcely possible for the vessels and connective tissue enclosed in a thin lamina between the folds of the peritoneum to be inflamed, without involving the peritoneum. Now, the cellular tissue is chiefly situated on either side of the uterus surrounding the vessels and nerves at the line of ingress and egress: in front of the lower third of the uterus where its cervix is attached to the bladder; behind the uterus and vagina, where a stratum connects these organs with the peritoneum and rectum; and between the peritoneal folds of the broad ligaments. All this cellular tissue may be described as continuous; and therefore inflammation beginning at one part may spread to the rest. The part which seems most isolated from the rest is that mass of tissue which connects the cervix uteri with the base of the bladder. Accordingly this part is occasionally the seat of inflammation, which may run its course without spreading beyond its own limits, and without implicating the peritoneum, at least in any important degree. But the like limitation can hardly be predicated of any other part of the cellular tissue. The vessels which so often carry the cause of inflammation, and the peritoneum, are in such intimate relation with the cellular tissue at the sides of the uterus, and with that in the broad ligaments, that the serous investing membrane can rarely escape.

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* "Maladies de l'Utérus," &c. 1870.

We thus come to the general conclusion, one amply borne out by clinical observation, that pelvic cellulitis, pure and simple, is a rare affection. Thus when we use the term "pelvic cellulitis," in the great majority of cases we use a term which only expresses a part of the morbid process. So far then the term is open to objection.

Again, the peritoneum covering in the pelvic organs being continuous with the abdominal peritoneum is subject to inflammation spreading to it from the abdomen. With this secondary inflammation we are not now concerned. The pelvic peritoneum is far more frequently the primary seat of inflammation, which, beginning here, may spread to the abdominal portion of the serous membrane. Now, if we ask how it is that the pelvic peritoneum is so prone to inflammation, we shall find a plain answer in the clinical and pathological facts. There is not—I say this with some confidence, yet not without reserve—evidence to show that inflammation begins in the pelvic peritoneum; inflammation in this membrane is excited by a morbid condition of the structures which it invests. That is, where the uterus, tubes, ovaries, vessels, and cellular tissue are healthy, scarcely any cause, other than extension of inflammation from the abdominal peritoneum, can produce inflammation of the pelvic peritoneum. The chief exceptions to this proposition are those cases where inflammation is kindled by some irritating matter poured into the peritoneal cavity, and which by gravitation or proximity to the seat of injury is chiefly concentrated in the dependent pouches of the pelvic peritoneum. And even in these cases where the peritonitis takes its rise in conditions independent of inflammation or disease of the pelvic organs, the cellular tissue, at least in some degree, soon becomes involved.

We come then to the further conclusion, that pelvic peritonitis, pure and simple, is also a very rare affection.

Disease rarely consents to the limits which medical nomenclature would assign to it. All terms, therefore, which profess to be precise definitions are pretty sure to be fallacious. If then we conclude that the terms "pelvic cellulitis" and "pelvic peritonitis," which have been for some time in use, imperfectly, and therefore inaccurately, represent what we find at the bedside, the more recent terms, which are equally exclusive, must be equally fallacious.

The more recent terms to which reference is made are those introduced by one of the greatest of living pathologists, one from whose authority no one can dissent without hesitating long. Virchow* proposes to substitute the terms "Perimetritis" and "Parametritis." He bases the first term on the analogy with "Pericarditis." Just as the serous investment of the heart may be the special seat of inflammation, so may the serous investment of the uterus. Perimetritis, then, may be taken as the equivalent of pelvic peritonitis. It is difficult to see any sufficient grounds for preferring the new to the older term. The analogy with the heart is surely strained. The heart is completely, solely, and everywhere closely invested by its own exclusive serous membrane; the pericardium reflected upon itself forms a special bag, within which the heart alone is enclosed. The pericardium then enjoys absolute immunity from inflammation extending from the serous investment of other organs; and comparative immunity from inflammation extending from any other source than the heart itself. Pericarditis probably, like pleurisy, chiefly owes its origin to offending matters carried in the blood. Peritonitis undoubtedly often owes its origin to like conditions. But the pelvic peritoneum, whilst not free from liability to inflame under general toxicohæmic influences, is exposed to inflammation from other causes. These are, as we have seen, metritis, salpingitis, oophoritis, pelvic cellulitis, inflammation of the vessels carrying septic matter from the uterus, irritating matters poured into the peritoneal sacs of the pelvis, and extension of inflammation of the abdominal peritoneum. The serous investment of the body of the uterus forms a very small part of a membrane which has numerous other relations, and which is therefore exposed to numerous sources of disease. If the term "perimetritis" be limited to the few square inches of peritoneum which covers the body of the uterus, it only expresses a very small part of the clinical case. Inflammation so limited is extremely rare. If the term be made to embrace inflammation of the serous membrane of the tubes, ovaries, and broad ligaments, then it is strained beyond its etymological meaning, and is wholly inadequate for clinical purposes. The correlative terms, "perisalpingitis" and "perioophoritis," proposed to supplement

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* "Archiv. für Pathol. Anat. und Phys." 1862.

"perimetritis," prove the inadequacy of this latter term. Themselves, they are hardly worthy of discussion.

I submit, then, that there is no sufficient reason for adopting the term "Perimetritis."

The term "Parametritis," intended to describe inflammation of the cellular tissue in the neighbourhood of the uterus, is also open to objection. It is less comprehensive than "pelvic cellulitis." It is not alone the tissue immediately surrounding the uterus which is exposed to inflammation. Indeed, inflammation of the cellular tissue is rarely so limited. Nor does it even always begin in this part. The inflammation in the broad ligament often begins from disease of the Fallopian tubes or ovaries, and may never reach the cellular tissue near the uterus.

We are driven then alike by etymology and by clinical observation to reject both the terms "Perimetritis" and "Parametritis" as being inadequate, and not justified by scientific necessity.

The truth being that the pelvic peritoneum and the pelvic cellular tissue being each liable to inflammation, we want the terms "pelvic peritonitis" and "pelvic cellulitis." And it being also true that in a great, perhaps the greater, proportion of cases, both peritoneum and cellular tissue are inflamed together, we want a term which shall express this common affection. The term "peri-uterine inflammation," adopted by Courty, answers to this want. It is indeed open to an objection, which not seldom meets us in medical nomenclature, namely, that it is a discordant compound of Greek and Latin. This may be avoided by substituting the term "perimetric inflammation." In adopting this term I mean to include inflammation involving the broad ligaments and their contents.

This term carries us back somewhat to the term "Phlegmonous intra-pelvic abscesses," adopted by Marchal (de Calvi), to whom science is indebted for the most important of all modern contributions to this subject.* His is the great merit to have shown that the chief seat of the puerperal and many other abscesses in women was in the pelvis. He thus exploded the erroneous ideas which connected these inflammations with the iliac fossæ.

And, since perimetric inflammation is so frequently consequent upon, and therefore complicates, inflammation of the uterus or its appendages, to express this compound condition we want the term "metro-peritonitis."

The researches of Bernutz† and of MM. Bernutz and Goupil,‡ conducted in the most admirably philosophical spirit, have been pre-eminently useful in extending and in correcting our knowledge of the subject. These researches have demonstrated that what had hitherto commonly passed for pelvic cellulitis was often pelvi-peritonitis. The phlegmonous masses rising out of the pelvis, and extending into the iliac fossæ, so frequently met with after labour, are shown to be, strictly speaking, not pelvic cellulitis, but peritonitis. This much, with some qualification, may be granted. But it is to be feared that here again is an instance of one idea making good its way by driving out another from ground where both have a common right. In these post-puerperal cases, with which we are the most familiar, because they most frequently come under clinical and post-mortem observation, there is almost always a complication of cellulitis and peritonitis; and, it might also be added, of metritis as well. The peritonitic element will, it may be admitted, generally predominate. But the other elements co-exist. It appears to me then that Bernutz, whilst rendering incontestable service in calling attention to the important part played by peritonitis in these cases, has rather undervalued the other factors of the disease.

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* "Des abcès phlegmoneux intra-pelviens." 1844.

† "Archives générales de Médecine." 1857.

‡ "Clinique médicale sur les maladies des femmes: Mémoire de la pelvi-péritonite et de ses diverses variétés." Paris, 1862.

In post-puerperal perimetric inflammation, which must serve for a type or illustration of other orders of cases as well, there may be distinguished three kinds:—

1st. That kind which, as far as we can judge, is simply inflammatory.

2ndly. A kind in which septicæmia plays a conspicuous part. The inflammation is of a low type. There is a tendency to diffuse, or erysipelatoid inflammation and to a general systemic empoisonment.

3rdly. There is a kind intermediate between the two preceding, in which there is a septic factor, but which is held in abeyance by the superior vigour of the blood. In these cases the septic matter is blocked out by the healthy blood coagulating in the efferent pelvic vessels, and intercepted by the lymphatic glands. In this way the system escapes, and the morbid influences are mainly concentrated in the pelvis.

In the first, or purely inflammatory kind, the action is chiefly spent upon the peritoneum. These may properly be called cases of pelvic peritonitis. They are analogous to the cases of pericarditis and of pleurisy, which supervene on a sudden impression of cold, when the pericardium and pleuræ have undergone unusual strain, the blood being also modified, under violent bodily exertion. The violent perturbation of parturition induces a peculiarly susceptible condition of the uterine and pelvic peritoneum, and an alteration of the blood which is favourable to the development of inflammation, if an exciting cause, such as cold or emotion, be applied. These are the cases to which the description of Bernutz more strictly applies.

In this order of cases the peritonitis, in many instances, does not break out until two or three weeks or more after labour. Thus, a young lady of delicate organization, suckled imperfectly for seven weeks; whilst menstruating she went to town, undergoing great fatigue, and came home with intense abdominal and pelvic pain and fever. Pelvic peritonitis had been produced. This is not an uncommon history. In another case a young woman was doing well until the fourteenth day after labour, when she was subjected to sexual intercourse. Shivering set in a few hours afterwards, and perimetric inflammation ensued.

But not even in all these essentially inflammatory cases is the inflammation chiefly expended upon the peritoneum. There is a sub-order of cases which appear to be essentially of traumatic origin, in which the chief, or at least the primary, seat of the inflammation is in the perimetric cellular tissue. During the passage of the child's head through the cervix uteri there is commonly laceration of the margin of the os, bruising of the mucous membrane, and of the whole substance of the neck, attended by a dragging or gliding movement of the structures in most immediate contact with the head upon the deeper parts. The cellular tissue around the cervix, where cellular tissue most abounds, is especially contused, stretched, vessels in it are torn, effusion of serum and ecchymosis take place in it. All this I have frequently verified by actual inspection. Everything is prepared for inflammation. There is the local injury, the effusion. There is the altered blood charged with effete matters, hyperinotic, under the influence of pregnancy and labour. An exciting cause alone is wanting. A chill is often sufficient. The chief seat of the inflammation in this case will be the wounded cellular tissue. In this tissue it may run its course, ending in resolution or in abscess; and affecting the peritoneum slightly, if at all.

In the second order of cases, characterized by the predominance of a septic factor, the inflammation of the pelvic tissues is universal. The uterus itself, its blood-vessels and lymphatics, the cellular tissue around and in the broad ligaments, and the peritoneum are all involved in a low kind of inflammation. The inflamed pelvic peritoneum throwing out unhealthy lymph which rapidly breaks down into pus, sets up the like inflammation in every part of the abdominal peritoneum with which it comes into contact. The poisonous matter may be generated in the woman's system under the strain of labour, her blood becoming overcharged with noxious materials, resulting from tissue-changes. To this order of cases I have given the name now generally adopted of "*autogenetic* puerperal fever."

In another order of cases the poisonous matter is inoculated, it comes from without. The woman, whilst in a highly susceptible state, takes in the poison of scarlatina or some other zymotic.

The general infection of the blood here acts as the exciting cause of inflammation; and the inflammation will naturally, in the first instance, break out in the pelvic tissues, rendered susceptible by traumatic action. In these cases again the inflammation will not be limited to the peritoneum. It will invade the uterus, cellular tissue, and peritoneum alike. It must, however, not be forgotten that patients seized with this, the "*heterogenetic*" form of puerperal fever, not seldom die of the fever before any marked local inflammation declares itself. A feature distinguishing cases of this order from the first or simple inflammatory kind, is that the disease commonly breaks out much earlier, that is, within three or four days after labour.

In the third, or mixed order of cases, in which there is a septic factor, controlled by a comparatively healthy state of the blood, the inflammation begins in the uterine sinuses and lymphatics. Under the combined influence of traumatism, and of blood somewhat impaired by the tissue-changes of pregnancy and labour, and sometimes of decomposing débris of placenta, membranes, and blood-clots in the uterus, foul matters form in the uterine cavity, get into the uterine sinuses and lymphatics, and, not arrested there, either from want of contractile energy of the uterine fibre, or because, being as yet too abundant for the blood it meets in its course to segregate by coagulation, it invades the vessels in the broad ligaments, where further progress may be stayed by the formation of clots. This thrombotic process is generally attended by inflammation of the peri-vascular tissues, and of the broad ligaments, which is pretty sure to involve the peritoneum. If the lymphatics be concerned as well as the veins, then the phenomena of phlegmasia dolens are developed.

That the broad ligaments are chiefly involved in the majority of these cases, seems proved by the seat of the tumefaction being in the sides of the pelvis; by the inflammation being in many cases unilateral; and by the uterus itself remaining in many cases apparently free from inflammation. That is, in this rather considerable order there is not necessarily inflammation of the peritoneal investment of the body of the uterus; that is, there is no perimetritis.

Trousseau may be cited as insisting upon the frequent complication of phlebitis with inflammation of the broad ligaments. He believed that phlebitis was the most frequent cause of this inflammation.

A very similar description will apply to the perimetric inflammations supervening on abortion. It applies often very closely to inflammation of the broad ligaments leading to phlegmasia dolens beginning in cancer of the uterus.

Hæmorrhage at the time of labour or abortion powerfully predisposes to perimetric inflammation. The parts being so predisposed, comparatively slight causes set up inflammation. A frequent cause is cold, usually so freely applied by ice or cold water injections, or by cold douche to the abdomen. Exposure to chill and getting about too soon are common causes.

It deserves to be remembered that pelvic peritonitis is not uncommon in the fœtus; and that in after-life the pelvic organs may remain bound by persistent adhesions. This condition, it is highly probable, renders the subject unusually liable to new attacks of peritonitis when the organs are called into functional exercise.

Perimetric inflammations occurring in the non-pregnant state, present features which it is interesting to compare with those which follow labour. They follow the same laws. When metritis is set up from the retention of decomposing matters in the body of the uterus, from traumatism, as from injury by the sound or other instruments, or from an intra-uterine pessary, the primary inflammation being in the body of the uterus, the secondary inflammation will attack the uterine peritoneum, at least chiefly. On the other hand, when the cervix is first attacked by inflammation, resulting from operations performed upon it, by the irritation of tents or other causes, the nearest tissue external to the cervix—that is, the cellular tissue in which the vessels run—will first catch the inflammatory process, and perimetric cellulitis will be the chief, perhaps the exclusive, secondary affection.

Another illustration of this proposition may be found in the history of epithelioma of the cervix. This disease in its progress long respects the body of the uterus; as it extends, it involves the perimetric cellular tissue, and it is often late before the peritoneum is attacked.

Perimetric inflammation, apart from pregnancy, is not uncommon as the consequence of suppressed or disordered menstruation. During this function, we have in miniature the conditions of pregnancy and labour. The gorged organs, caught in a state of intense susceptibility, are exceedingly prone to become softened. Probably, too, in many of these cases there is some exudation of blood into the peritoneal cavity as a primary factor in the inflammatory process. In these cases, dissections of Bernutz and Goupil prove incontestably that it is the peritoneum which is the chief seat of inflammation. They found the cellular tissue perfectly free. This is no subject for surprise. Abortion and arrested menstruation differ from labour in this particular: the cervix escapes all traumatic injury; the seat of functional activity, and therefore of susceptibility, is the body of the uterus, the tubes, and the ovaries. Hence the body of the uterus, the tubes, and ovaries are primarily subject to inflammation, and inflammation of these organs is readily followed or attended by inflammation of their investing membrane.

Bernutz and Goupil affirm, and, if I may be permitted to express my own opinion, prove, that pelvic peritonitis, acute or chronic, takes its origin, in a vast proportion of cases, in disease of the uterus, tubes, and ovaries; that peritonitis is, therefore, secondary, symptomatic of other disease. They further maintain that inflammation of the pelvic peritoneum proceeds more frequently from inflammation of the tubes and of the ovaries than from inflammation of the uterus.

Although facts enough exist to prove that metritis, acute or chronic, may excite inflammation of the peritoneum, yet it is a remarkable clinical fact that, common as chronic metritis is, the uterus rarely becomes fixed, as it would be, were its peritoneum to become inflamed.

Although pelvic peritonitis in a large proportion of cases is caused by disease of the uterus, tubes, or ovaries, or is secondary upon pelvic cellulitis, it is nevertheless true that there is a large class of cases in which this membrane is the seat of primary inflammation. For clinical purposes it is important fully to recognize this distinction. The history of the two orders of cases is often strikingly contrasted. The secondary form following upon diseases of the pelvic organs is of course preceded by the symptoms which belong to those diseases; the peritonitis is an epiphenomenon, declaring itself in the course of another disease; its special characters often make their appearance gradually, even insidiously, being for a time masked by those of the original disease. On the other hand, the primary peritonitis makes its appearance suddenly; it is ushered in by acute and severe symptoms, often by shock or collapse, and other signs of traumatism or local injury. Such is the history of peritonitis caused by the escape of offending matter from the Fallopian tube, either running from its fimbriated extremity, or from bursting or perforation of its walls; from bursting or perforation of an ovarian cyst or abscess; from rupture of the uterus, or of an extra-uterine gestation-cyst; from effusions of blood into the peritoneum; from perforation of the intestine; from perforation of a dermoid cyst.

Even in some cases of this class the symptoms are not marked by suddenness of invasion or by great severity at first. For instance, when an ordinary ovarian cyst or a dermoid cyst undergoes perforation, the amount of irritating matter escaping into the peritoneal cavity may be small, and the consequent peritonitis will be limited and subacute.

Pelvic peritonitis may, like inflammation of the peritoneum of the abdominal intestines, arise from 1, tubercular; 2, cancerous; or 3, traumatic affections.

Encysted serous peritonitis may appear to be, and sometimes is, associated with antecedent pelvic disease.

The connexion of some unilateral pelvic or abdomino-pelvic abscesses with a pelvic origin is sometimes obscure. We make out clearly enough an abscess, and even define its limits; but dissection only can reveal the cause of the peritonitis, the products of which envelope and shut out from observation the offending disease. This is illustrated in the case related at page 417, in which a small ovarian cyst was found embedded in a peritoneal abscess.

Perimetric inflammation is rare after the menopause. This fact confirms the modern view that this inflammation takes its rise almost invariably from the inflamed uterus tubes or ovaries. This proposition, although generally true, is however often affirmed too absolutely. Malignant disease, especially of the body of the uterus; chronic metritis, depending upon stenosis or flexion; the various forms of hypertrophy of the mucous membrane attended with hæmorrhage, are very liable, especially on rough surgical treatment, to lead to perimetric inflammation. It may also result from local violence, such as too frequent subjection to sexual intercourse.

Bernutz gives a summary of the cases observed. Of 99 cases of pelvi-peritonitis—

43 were puerperal	35 after delivery at term 8 after abortion
28 were blennorrhagic	
20 were menstrual	
8 were traumatic	3 after venereal excess 2 after syphilitic disease of cervix 2 after use of the sound 1 after the use of a vaginal douche.

But to these causes must be added, the effects of diseases of the uterus, tubes, and ovaries, and of the other organs of the pelvis; the accidents arising during the growth and degenerations of tumours, ovarian, dermoid, or other.

Peritonitis meretricum; gonorrhœal peritonitis.—When gonorrhœal infection is the starting-point, the course is usually as follows:—The poison, acting first at the point of contact, lights up inflammation of the vaginal and cervical mucous membrane. This spreads to the mucous membrane of the body of the uterus, thence along the Fallopian tubes. The ovaries are very commonly engaged. In the case of gonorrhœa, Dr. Matthews Duncan says, "he has never seen pelvic inflammation come on without the presence of ovaritis in addition, and as the ovaritis follows the endometritis, so the latter is itself a consequence of the original vaginitis." In some of these cases, proof has been obtained that the peritonitis was immediately caused by the escape of infected pus from the fimbriated ends of the tubes. But in many cases, probably, the peritoneal coat of the tubes and ovaries becomes inflamed, consequent upon the inflammation of these organs.

Mr. Giles* relates three cases in which peritonitis, the result of gonorrhœa, broke out after childbirth. It must not, however, be concluded that the peritonitis of prostitutes is always traceable to infection. In many instances there can be little doubt that it is due to the wilful suppression of menstruation by the local application of cold, and to other forms of exposure and violence.

In this place reference must be made to the doctrine of "latent gonorrhœa" set forth by Dr. Emil Nœggerath.† He submits that gonorrhœa apparently cured, may persist in certain sections of the organs of generation, in the male as in the female, for life, constituting "latent gonorrhœa;" that in this form it may infect a healthy person with acute gonorrhœa or gleet; and that in the female it may pass from the latent into the apparent form, and give rise to acute, chronic, or recurrent perimetritis or ovaritis. It is obviously difficult to prove or to disprove how far this doctrine can be substantiated. I cite it, believing that it has at least an apparent basis in facts; and that the subject is worthy of further investigation.

Course.—When the opportunity occurs of examining the subject of pelvic cellulitis in the early stage, we may find a lax condition of the connective tissue; its meshes infiltrated with serum, lemon-coloured, and limpid, or turbid and brownish, from being stained with blood or mixed with pus. When the affection is the result of labour, there is commonly ecchymosis from the rupture of small vessels.

At a later stage, the watery part of the serous effusion has disappeared; there is a firm, more or less circumscribed tumefaction, which on section exhibits reddish points, and evidence of hyperplasia.

In some cases, comparatively rare, pus is found in the phlegmonous swelling. But almost always when this is the case the peritoneum is involved, and the appearances are lost in those characteristic of peritonitis.

The chief character of peritonitis, of course, is plastic effusion. But this is preceded by intense vascular injection of the membrane. It is bright with punctate, stellate, and arborescent injections, and it is often uniformly red.

The membrane has lost its glistening smoothness; it looks villous or granular. This condition probably lasts only a few hours. Plastic lymph is quickly thrown out over the whole inflamed membrane, and glues opposing surfaces together. It is common to find the ovaries and tubes enveloped in a mass of yellowish lymph, more or less solid, and united to the peritoneal lining of the iliac fossæ, the summit of the bladder, the anterior wall of the lower part of the abdomen, and the front of the rectum. The fundus of the uterus is the part that most frequently escapes. As in life this part can often be felt and made out distinct from the firm tumefactions on either side or behind it, so after death we often find it cropping out comparatively unaffected from the fibrinous conglomerations of the sides and hollow of the pelvis.

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* "British Med. Journal," 1871.

† "American Gynæcological Transactions," 1876.

At a stage more advanced in progress, but often even earlier in point of time, evidence, more or less extensive, of suppuration will be found. Where there was a septic factor, the lymph may be found in flakes, dirty red or yellow, adhering loosely to a dull-red peritoneum ; easily breaking down, this lymph will be seen pultaceous, semi-fluid, purulent. In the half-circumscribed cavities formed between the imperfectly-adhering peritoneal surfaces, a dirty turbid serum collects ; or, in some cases, the lymph seems to have no plastic property at all ; then on being opened streams of dirty serum and pus flow out from the general peritoneal cavity.

In the stage of recent effusion, the parts can be separated by breaking down the still soft agglutinations. The ovaries or tubes or uterus, in which the inflammation probably began, will then be seen red or dull on their peritoneal aspect, generally swollen beyond their normal bulk, and fuller of blood. At a later stage, but still not remote from the beginning, the effusions found will be increased in bulk and solidity. The organs, especially those of the pelvis, will be so buried in the consolidated masses of effused matter, that only by tedious dissection can they be traced and isolated ; often the ovaries will be glued to the posterior wall of the uterus.

If a case in life correspond to the above description, recovery by resolution may still occur. The swelling seems to melt away, and the only post-mortem evidence of what has gone before are dull-white strings or bands tying the ovaries and tubes to the sides or posterior surface of the uterus, or to surrounding structures.

Perimetric or Pelvic Abscess.—In many cases suppuration takes place. Various estimates, fairly open to all the objections that invalidate most statistical operations performed upon pathological histories, have been made to express the proportion of cases which end in suppuration. It is certainly large, probably much exceeding those which end in resolution. McClintock, out of seventy-seven cases of puerperal pelvic cellulitis, found thirty-seven end in suppuration, with discharge of pus ; twenty-four burst or were opened externally ; six discharged through the vagina ; five through the anus ; and two burst into the bladder. The termination in suppuration is liable to be overlooked. Pus escaping into the rectum, or even into the vagina, may not be noticed, or, if observed, may not always be set down to the right source. These undetected suppurations naturally go in a statistical table to swell the number of cures by resolution.

The clinical physician will form a much more correct prognosis as to the advent or not of suppuration, by weighing the characters of the case before him. If there be septicæmia; if the patient be of strumous or lymphatic diathesis; if she be reduced by hæmorrhage; if, in short, the individual conditions be of a depressing kind, the probability of suppuration is vastly increased.

Generally, but not always, in this event a fresh increment of the febrile symptoms is observed. Shivering or rigor occurs; the pulse is subdued in power; sometimes vomiting is excited. These mark the first entry of septic matter into the circulation, and constitute the stage of shock. The characteristic is depression. Then come the signs of reaction. The pulse is accelerated, the temperature rises. If the amount of septic empoisonment be great, signs of attempt at elimination appear. The poison, carried like almost all poisons to the intestines, irritates the mucous membrane and causes diarrhœa; and perhaps vomiting is again excited. This is the stage of irritation or elimination. If only one moderate dose of the poison is imbibed, the signs of constitutional irritation quickly subside; but if, as often happens, fresh doses continue to be imbibed, the symptoms of shock, reaction, and elimination will recur in regular order. This dependence upon the repeated dosing with, or accumulation of poison, is remarkably proved by the cessation of these signs when the purulent collection bursts or is artificially opened, or the case merges into chronic septicæmia. The aspect becomes dull, earthy; the patient emaciates; loses appetite; she is harassed with irregular attacks of shivering and flushes; prostration advances. This state may be protracted through many weeks.

Suppuration goes on, in many cases for two or three or four weeks before the pus breaks through its investing sac. This event is achieved in one or more of three chief directions:—1, through the skin: 2, through a mucous membrane; 3, into the serous sac of the peritoneum.

In some cases imperfect and temporary relief only is obtained on the discharge of pus. The hard tumefaction in the pelvis subsides but slightly. Hectic or irritative fever continues. Pus continues to flow in more or less remittent or intermittent discharge; and sometimes successive purulent collections form, and burst at intervals, extending over weeks, months, and even years, until the patient sinks exhausted.

In some cases of this class, happily the most frequent, the suppurative action at length ceases, the cavities contract, the solid deposits gradually become absorbed, and the recovery may be complete, even the adhesions disappearing. The rigors cease when the pus finds an external vent. But patient and physician must be prepared for a tedious course of treatment.

Where the septic element has been inconsiderable, and especially where the inflammation has been excited by disease of the tube or the ovary proceeding slowly, or only inflicting upon the peritoneum a succession of slight injuries, repeated at long intervals, the pelvic organs may, as in more acute cases, be found embedded in thick masses of hard brawny effusion, involving the rectum and the superincumbent small intestines and omentum. This condition may last, kept up or extended by occasional accessions of fresh inflammation, for many months, or even years. This is the case especially when the inflammation is excited by a diseased ovary, cystic or dermoid. But sooner or later, under the irritation of the advancing disease, or of some accidental intercurrent cause, suppuration comes on. The pus forming in the substance of the effused mass, commonly beginning at the surface or in the substance of the diseased organ—by a process incident to the disease, one of the events of which is bursting or perforation—forms an abscess, or a congeries of purulent collections. Up to a certain time an abscess thus formed may be fairly encysted or isolated by effusions which shut it off from the healthy portion of the peritoneal sac. The imprisoned pus may even undergo a transformation which ends in absorption. But in the majority of cases the sac of the abscess, extending its adhesions by eccentric action, effects a consolidation with some structure through which a communication can be made with the exterior. Thus a pelvic abscess will make its way to the external surface through the skin, or into the intestine, bladder, vagina, or rectum; or unfortunately failing in these directions, it may perforate its own sac, and pour its contents into the peritoneal cavity. In this latter event we shall have the ordinary phenomena of "abdominal shock," often fatal speedily; and if not so, then followed by peritonitis, from which the patient may or may not recover.

If the pus work its way out by the skin, the place of election is most commonly the iliac region above Poupart's ligament. Before this happens there will have been a history of irritative fever, marked generally by rigors more or less distinct; by small pulse, ranging from 100 to 120; by temperature running up to 101° F., 102° F., or 103° F.; by sweats; occasionally by diarrhœa. The hard, somewhat elliptical mass, becomes softer, doughy; near the skin, a patch at first red, then bluish, appears; fluctuation becomes distinct; and then, if the abscess be not opened, it bursts.

Sometimes the abscess points nearer to the median line below the umbilicus. This is more likely to be the case if the cause of the peritonitis be a dermoid ovarian cyst. Where the inflammation takes its rise deep in the pelvis by the side of the vagina, it will sometimes find an exit by the outlet of the pelvis through the perineum. I have seen several examples of this in puerperal cases. In these the evacuation has been preceded by great distress from the intra-pelvic pressure on the bladder and nerves. It has also made its way by the sacro-sciatic notch, or by the side of the anus.

I believe, however, the route most frequently selected is the vagina. An opening is made through the roof, mostly behind or to one side, more frequently the left, of the cervix uteri. This issue, as well as that by the rectum, is sometimes overlooked. The pus escaping perhaps gradually is not distinguished from the other discharges. When the inflammation is retro-uterine, the pus will almost always make its way by the roof of the vagina or by the rectum, just as a retro-uterine hæmatocele will do. I have known one or two cases in which the abscess opened into the cervix uteri.

Occasionally abscess after abscess points in different places, or sinuses keep open, and continue to drain off the secretions formed in the suppurating cavities. These cavities seem to be prevented from closing by the rigid walls composing them being fixed to the sides of the pelvis or to the intestines. An exhausting suppuration then goes on, lasting for months and even for years, until the sufferer sinks from inanition, the wear and tear of pain, and the gradual impairment of vital functions. These cases of protracted suppuration are, I believe, mostly the result of inflammations set up by the perforation of ovarian cysts, or of an extra-uterine gestation cyst, or a dermoid cyst into the vagina or the rectum or some higher part of the intestine. The issue is not seldom fatal.

But I have seen similar cases which followed upon labour and abortion, after surgical operations upon the uterus, and after wearing a fixed intra-uterine pessary.

The protracted intermittent course of some of these suppurating cases is partly explained by the multilocular character of the abscesses or suppurating cavities. These burst successively. Perhaps the suppuration in one compartment sets up suppurative action in the rest, and so on. How these multiple abscesses form is probably accounted for by the irregular shape and the movements of the organs which form the framework or scaffolding of the peritonitic effusions. The intestinal folds and convolutions form endless recesses and projections, and the plastic layers which invest them will follow, to a great extent, these recesses and projections; whilst the incessant vermicular movements and the alternations of distension and collapse of the coiled intestinal tube, acting whilst the effused matter is still soft, will leave irregular spaces, divided partially or completely by septa running in various directions. These hollow irregular spaces will in the first place be filled with serum, or sero-purulent fluid, which at a later time is replaced by pus. When the solvent process of suppuration has set in, the septa gradually break down; the pus-containing spaces are fused together more or less completely. But the process is tedious, and it may be long before it is complete.

This irregular multilocular arrangement will also account for the fact that perimetric abscesses sometimes open in several directions. Thus we may see an abscess first make an exit at the iliac region; then, successively, it will burst in the rectum and vagina.

When such abscesses with thick walls, not capable of collapsing under atmospheric pressure, burst or are opened, air is sometimes drawn in. Decomposition of retained pus and blood ensues, so that the discharge becomes extremely offensive. The sac, which hitherto emitted a dull sound on percussion, will now be resonant. To a certain extent, often effectual, pressure by well-regulated compresses will supplement the failure of atmospheric pressure, in keeping the walls of the empty sac in contact.

One possible termination, happily rare, of which I do not remember having seen an unequivocal example, is sloughing or gangrene. Grisolle* describes it as follows: "Gangrene is scarcely ever observed except in abscesses consecutive to mortification of the cæcum or of its appendix, and to the escape of stercoraceous matter into the neighbouring cellular tissue. I do not believe that gangrene has ever been observed in abscesses of spontaneous origin, which are developed in the sub-peritoneal cellular tissue. If, on the contrary, the inflammatory engorgement, although spontaneous, is subjacent to the fascia iliaca, this may produce there a true strangulation of the inflamed parts; and it will be sufficiently common to see in those sub-aponeurotic abscesses the fibres of the iliac muscle blackish, softened, and exhaling a fetid odour. No symptom can produce a sure diagnosis of this unfortunate termination; but, when issue is given to the effused matter, it exhales a fetid odour, and brings with it gas, fæces and bits of cellular tissue, of muscles, and of mortified tendons. One can understand that death should be the consequence almost inevitably of such disorders."

I, however, once tapped an encysted serous peritonitic effusion giving issue to a small quantity of fæcal matter, foul gas, and horribly stinking serum, which ended in recovery.

Matthews Duncan mentions as one "peculiarity of pelvic, and probably of perimetric abscess only, that some have no tendency to burst at all. He has repeatedly opened such abscesses, whose existence certainly dated several years before his seeing them, and which showed no tendency to point in any direction." Such abscesses are occasionally found in the dead-house. One was observed in a woman who died shortly after admission into my ward at St. Thomas's. I had recognized in her a pelvic peritonitis six years before. The inflammation and suppuration were found to have arisen around a dermoid cyst.

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* "Arch. Gén. de Médecine," iii. série, tome iv.

The *course* that perimetric inflammations run, and the *pathological appearances* will vary according to the parts involved, the complication with, or absence of, septicæmia; the diathesis or constitutional state of the patient; the treatment and other accidental circumstances.

In puerperal cases, perimetric inflammation, including cellulitis, is especially prone to arise in women of strumous diathesis. The same subjects are particularly prone to inflammation and abscess of the breast. I have little doubt, although I have not made out the fact with equal distinctness, that the same diathesis also disposes powerfully to like inflammation in the non-pregnant state. In women of this constitution lymph is rapidly and freely thrown out, forming large tumefactions. The effused matter, more readily than in sound constitutions, degenerates into pus. Dissections at different stages of perimetric inflammation appear to me to prove that it is not always, perhaps not even generally, the plastic or semi-coagulated lymph which, in the first place, is transformed into pus. There is commonly a considerable quantity of thin serous fluid which becomes enclosed by the plastic effusion, forming a cyst single or many-celled around it. It is this serous fluid which forms, as it were, the focus of the phlegmon which becomes turbid and purulent. Very soon no doubt the innermost layer of the plastic investment breaks down in part, and contributes to the purulent collection, helping to form the abscess.

That this plastic investment does give way is proved by the abscess bursting or perforating.

The effusion sometimes takes place with great rapidity, as in the following not rare case: A young lady, who had been delivered of her first child about two months, and had returned to usual avocations, took a long walk, came home fatigued to her husband, was next day seized with intense pain in the lower abdomen and vomiting; constipation and tympanites followed. On the fifth day, I found the uterus set fast in a mass of firm effusion; the bowel also was so compressed that there was nearly complete obstruction for nine days. Under rest, opium, and enemata, she got well.

In a number of cases, very difficult to estimate, the inflammation terminates in resolution. The effused consolidated masses of plastic matter gradually disappear. As this process goes on, the uterus recovers its mobility, if not entirely, to a great extent. The finger begins to travel around the vaginal-portion. The subjective symptoms become moderated. This process usually takes several weeks, even months, for its completion. In a considerable proportion of cases I have seen the whole process completed in eight, ten, or twelve weeks. But the last stage often lingers longer still.

In not a few cases, when the bulk of the effusion has melted away, there remain *cellular adhesions* which may restrain the movements of the uterus, and bind it down in various directions. Thus, adhesions between uterus and bladder will produce anteversion; adhesions in the retro-uterine pouch will produce retroversion; and we may find lateral inclination from ovario-uterine and alar adhesions. These adhesions undoubtedly often practically disappear—that is, under the constant strain of the pelvic organs in their functional movements, the adhesions incessantly stretched undergo atrophy complete or partial, so that they no longer impede the uterus. In the case of retro-uterine adhesions, I have often accelerated their atrophy by the use of a lever-pessary, which, lifting up the fundus uteri, puts these bands on the stretch. One very efficient cause of their disappearance is pregnancy. The uterus enlarging, drags and attenuates them, so that they undergo atrophy. On the other hand, they sometimes last an indefinite time, binding the uterus down in various abnormal positions, impeding this organ in its natural movements, and thus leading, as Madame Boivin insisted, to abortion. The ovaries, which possess much more limited natural movement, and are, moreover, smaller and less rigid bodies, are not so capable of exerting a strain upon adhesions, and are consequently more frequently doomed to perpetual bondage.

Aran examined fifty-three women who died in his wards with reference to this point. He found adhesions in twenty-nine. The adhesions were twice as common in women who had had children as in women who had not. These, of course, are selected cases dying in a special gynæcological ward, and cannot represent the general proportion of adhesions.

I have had the opportunity of watching the course of several cases of adhesions with requisite precision. A young woman was admitted into my ward with retro-uterine hæmatocele. The blood-mass made its way through the roof of the vagina, and on several occasions we saw blood oozing through the opening. I passed a probe three inches into it. When the opening closed the tumour gradually disappeared, and it was found that the body of the uterus was pulled back, and held in that position by adhesions. Six months later the uterus had nearly recovered under the gradual lifting action of a Hodge-pessary.

When the uterine adhesions are persistent and short, binding the uterus down tightly, they may be the source of severe pain. They may keep up congestion or chronic metritis. And so long as adhesions remain there is a liability to renewed attacks of peritonitis. This disposition to relapses, or the "*redoublements*" of French authors, is always to be borne in mind in the antecedent stages whilst the inflammatory effusions are still thick and hard.

The *symptoms* of perimetric inflammation are generally compound. In order of time, signs of disease of the uterus, tubes, or ovaries commonly take precedence. Then follow those of perimetric inflammation. And these are for the most part severe enough to overwhelm and obscure those of the original disease. This addition of perimetric inflammatory signs is usually more or less sudden. It is marked by acute intra-pelvic pain; more or less shock, according to the cause; acceleration of pulse to 120 or 130; heat of skin, the temperature rising to 103° F., 104° F., or even 105° F.

There is a sense of fulness and pressure, sometimes of bearing-down. The bladder and rectum are often disturbed in their functions. Tympanites, the result of a kind of paralysis of the intestines whose peristaltic movements seem to be instinctively restrained in order to avoid pain, is a common symptom. This induces constipation, which is further caused by the narrowing by compression of the rectum, and by the inability to exert effectually the expulsive movement necessary to defæcation. Some amount of dysentery is not uncommon. Colic pains, tormina, flatulence, are often exceedingly distressing.

The bladder symptoms are often distressing, but are not constant. There is dysuria, frequent call to pass water, an unsatisfied sense of the bladder not being emptied. This distress is partly due to the interference with the contractile action of the bladder, and with the abdomino-pectoral act of expulsion, and partly to the irritating quality of the urine. This is often loaded with lithates and mucus. If an abscess be about to burst into the bladder, the dysuria increases, and not uncommonly there is retention of urine. When the bursting has been effected, of course pus will be voided with the urine. Retention may also precede the bursting of an abscess into the rectum or vagina.

The ovario-uterine function is variously affected. Sometimes there is metrorrhagia. This is especially the case when there is concomitant metritis or sub-involution of the uterus with abrasion of the mucous membrane of the cervix. But, not uncommonly, even in post-partum cases, in which sub-involution is a tolerably certain attendant condition, menstruation is scanty or suspended.

The secretion of milk is generally suspended either quickly or gradually. In spite of the mother's anxiety to keep it up, it falls off; it is rather exceptional for it to last out the course of the disease; and still more rarely is it judicious to make the attempt.

When the seat of the inflammation is in one side of the pelvis the thigh is commonly kept slightly flexed to relieve the pain which extension by stretching the inflamed structures produces. This causes the patient to limp on the affected side when walking. This lameness is so characteristic that I have often diagnosed lateral pelvic inflammation to my class on seeing a woman enter the consulting-room with the anæmic aspect following parturition, and this painful limp.

In some cases the patient finds she cannot get the heel to the ground. In not a few cases one or both legs swell soon after labour, constituting the earliest sign to attract attention.

Sciatica on the side of the effusion is a symptom I have several times observed. In one the pain along the sacral plexus of the left side was very severe, and underwent exacerbations marked by recurrent suppurations, over a period of twelve years. The sciatica disappeared when the disease was cured.

When suppuration is proceeding, the sense of intra-pelvic tension and of pain is increased.

In some puerperal cases I have observed pelvic inflammation to be complicated with metritis. This indicates, I believe, a strumous or leuco-phlegmatic diathesis.

The Diagnosis.—The objective signs are made out by abdominal, vaginal, and rectal touch. *Palpation over the lower part of the abdomen*, especially if the hand be pressed into the pelvic cavity, gives rise to acute pain. There is often some degree of tympanites; and almost always tension of the abdominal muscles, excited by the dread, even more than by the act, of examination. In the early stage no very marked tumefaction or irregularity may be felt in the pelvic brim; but very soon a firm mass, more or less rounded or cylindrical, is made out in one or other, or in both sides of the pelvic brim; the hand encounters resistance in the attempt to pass it into the pelvis above Poupart's ligament; as the disease continues, this tumefaction extends out of the pelvis, spreading laterally and forwards into the iliac fossæ, bulging out above Poupart's ligament, and sometimes rising as high as the level of the umbilicus. This swelling is hard, brawny, tolerably uniform, cylindrical. At an early stage the skin can be moved over it; but later, especially if the process be tending to suppuration, the abdominal wall becomes one with the tumefaction underneath.

The shape and limits of the tumour rising out of the pelvis can usually be defined by the hand pressing in the abdominal wall above, and getting even a little way behind the tumour. By percussion the evidence thus obtained may be checked and extended. An area of dulness will correspond with the tumefaction behind the abdominal wall, whilst resonance will disclose the position of the intestines.

The *vaginal-touch* gives the most decisive evidence. The examining finger entering the vagina is first conscious of increased heat and puffiness of the walls. The os uteri is reached much more readily than in the ordinary state, because an almost invariable effect of the perimetric inflammation is to bring the uterus down to a lower level. The situation of the os uteri is usually near the centre of the pelvis. This is the case when the chief seat of inflammation is in the broad ligaments or in the sides of the pelvis. If one side be chiefly affected, the cervix may be pushed over towards the opposite side. But if the case be one of retro-uterine cellulitis and peritonitis, the uterus is pushed bodily forwards, coming sometimes so close to the symphysis pubis as to compress the neck of the bladder, and cause retention of urine.

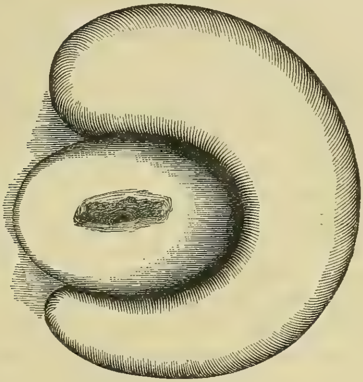

FIG. 106.

REPRESENTING THE COLLAR OF HARD INFLAMMATORY EFFUSION ENCIRCLING THE CERVIX UTERI (R. B.).

In post-puerperal cases the os uteri is generally more or less patulous. Surrounded as it is by inflammatory effusion, contraction and involution are impeded. Feeling round the margin of the os uteri, we commonly fail to define accurately the usually projecting vaginal-portion. Instead of the hemispherical or conical smooth mass, merging at the fundus of the vagina into soft yielding tissue, we find hard brawny bumps occupying the summit of the vagina, encircling the os down to, or even below its level, preventing our feeling any portion of the cervix. If the inflammation be general, that is what is felt. But if the inflammation be unilateral or anterior or posterior only, the inflammatory swelling projects in the corresponding part only, leaving the remaining part of the circumference of the cervix accessible to the finger; and the uterus will be fixed on the side of the swelling. This is represented in Fig. 106, from a case under my care.

When the inflammation is limited to the peritoneum of the body of the uterus and the utero-vesical reflection—and I have seen several such cases, strictly "perimetritis"—the adhesions contracting in the chronic stage pull the fundus down in nutation; the os uteri is thrown up and backwards in the contrary direction, so that it is actually higher than normal. And since the mass of cellular tissue between the cervix uteri and the base of the bladder may not be affected, the finger is free to travel all round the vaginal-portion in front as well as elsewhere. But by pressing a little firmly in the anterior vaginal roof we are sure to come upon a firm resisting plane or prominence, which is caused by the inter-utero-vesical consolidation.

Fixing or immobilization of the uterus may generally be accepted as a sign of peritonitis with adhesive effusions. In the case of localized cellulitis, especially in the utero-vesical connexion, the uterus may move along with the phlegmonous mass and the bladder.

In the case of retro-uterine peritonitis, the tumefaction or rather tumour formed by the effused lymph and serum, may attain considerable magnitude, pushing the uterus forward, rising above the fundus of this organ, and coming within reach of the fingers applied above the symphysis pubis. In not a few cases, even, the peritoneal investment of the opposed intestines and omentum being caught, a large firm tumour may be formed, reaching to the umbilicus and even higher. This is especially the case when the peritonitis is caused by a retro-uterine hæmatocele.

When the inflammation is unilateral, I have often been struck with the sensation of a firm, almost knife-like, or rather "hog-back" ridge, running from the edge of the os uteri across to the side of the pelvis. In these cases, in the adhesive stage, the fundus uteri is pulled towards the affected side.

The sound, although not generally necessary, often lends precision to the investigation. For instance, when adhesive inflammation prevents the finger in vagina, or hand above pubes from tracing the form and position of the body of the uterus, this being concealed in a mass of firm effusion, we cannot easily tell whether a hard rounded mass projecting the posterior roof of the vagina be the retroflected uterus or a retro-uterine mass of inflammatory deposit. The sound at once puts us right by defining exactly the course of the uterus. The sound in uterus thus serves as a central axis from which we may estimate the relations, bulk, and nature of all the surrounding structures. It also enables us to test more closely the degree of mobility the uterus enjoys. The sound being in the uterus, on depressing the fundus or the inflammatory mass above the pubes, any movement imparted is clearly seen and felt by the descent or obliquity communicated to the handle of the instrument. Mobility *en bloc* is preserved in a modified degree until the adhesions extend to the walls of the pelvis.

When, suppuration having taken place and the abscess is pointing in the roof of the vagina, we may feel a part which before had been hard, brawny, become soft, permitting the tip of the finger to sink in, and immediately to bulge again as pressure is taken off. This is fluctuation. The pointing spot, soft and prominent, is surrounded by a hard mass.

Rectal touch furnishes valuable assistance. It checks and extends the information obtained by abdomen and vagina. The finger, coursing along the anterior wall of the rectum, can reach considerably above the level of the os uteri. If the case be one of inter-utero-vesical cellulitis, the finger can explore the posterior wall of the uterus, determine its condition, and ascertain if it be bent or straight, free or not from tumour. In the case of lateral cellulitis and peritonitis, the finger can commonly feel above the lower margin of the inflammatory swelling projecting into the vagina, and even trace it as a curved ridge across to the sides of the pelvis. Combined with abdominal palpation, the size, position, and relations of the uterus with the surrounding inflammatory swellings can often be defined.

The finger having reached the level of the os uteri, comes upon the hard peri-uterine tumefaction; it is commonly compelled by the backward projection of this tumefaction to be directed backwards into the hollow of the sacrum, following the globe which carries the anterior wall of the rectum against the posterior wall. In this way we sometimes find the rectum remarkably compressed, and its calibre contracted. Tracing the inflammatory swelling to the sides of the pelvis, we find the pelvic structures, those of the broad ligament especially, fixed to the pelvic wall, perhaps on either side of the rectum, by adhesive effusion forming a collar through which the rectum passes.

Four varieties of peritonitis in many points resemble pelvic peritonitis, and, indeed, frequently are associated with it. One is *perityphlitis;* the second, a *localized adhesive peritonitis, occupying one iliac fossa;* the third, peritonitis of the lower part of the abdomen connected with *cancerous affection* of the pelvic organs and lumbar glands; the fourth is *tubercular peritonitis,* which may have its first and chief origin in the pelvic or hypogastric regions.

In the case of *perityphlitis,* the tumour is always on the right side; it is higher, generally, than inflammations springing from the pelvis; it rarely passes beyond the median line, and does not extend into the pelvic cavity; and the greatest bulk or diameter of the tumour is above the pelvis, whereas in pelvic peritonitis, the supra-pubic portion of the tumour can be traced downwards into the pelvic brim, and by combining vaginal touch is felt to be a part of inflammatory masses in the pelvis. The *localized peritonitis of the hypogastrium* is also distinguished by its not penetrating the pelvic cavity. And in both these cases the mobility of the uterus is commonly preserved.

The *cancerous inflammation* in many cases takes its rise in malignant disease of the ovaries; and especially when the lumbar glands are involved. In this case the disease is not so often localized or encysted. Dropsy of the peritoneum not seldom attends. The signs of the cancerous cachexia will rarely be absent. But at certain stages of either disease vaginal examination may lead into error. Before the ulcerative stage of cancer has commenced, and therefore before the malignant cachexia has become marked, the uterine neck may be found set fast in the roof of the vagina by surrounding deposit, hard in some cases to distinguish from the deposit of simple inflammation. There are features of differentiation. In malignant disease of the vaginal-portion, in the first place, the history will generally be different; the disease has come on insidiously; its early stages have probably escaped observation; whilst in perimetric inflammation the starting-point is usually labour, abortion, a chill, accident, surgical operation, or other well-defined antecedent. In malignant disease, the perimetric effusion is usually pretty uniform, that is, it extends all round the vaginal-portion, catching the bladder and rectum; whilst in inflammation the deposit is often unilateral or anterior or posterior, causing deviation of the os uteri from its central position, and permitting the finger to touch a part of the circumference of the cervix, and ascertain that it is smooth.

When these points are made out, the diagnosis of perimetric effusion is sufficiently decisive. But occasionally cancer is first noticed shortly after a labour; and not seldom inflammatory deposits encircle the vaginal-portion all round. In these ambiguous conditions, we must fall back on individual *tactus eruditus;* and now and then we must suspend our judgment, waiting for the more characteristic changes which time will certainly bring. That there is a difference in the feel of a cancerous os uteri and its *entourage* and that of inflammatory effusion, is certain. The first is more nodular, perhaps harder, "stony;" the disease, in short, may be traced to the cervix uteri itself, as its centre of departure, whilst this part is only engorged, abraded perhaps in the second case. But it is difficult to describe the tactile sensations produced by degrees of solidity and shape. Practice alone can teach the finger to recognize them.

A difference worth remembering is, that cancer makes a hard cervix, whilst pelvic cellulitis or peritonitis makes hard masses round about the cervix. Cancer begins in the cervix; inflammation is peri-cervical.

The chief objective characters of perimetric inflammation are described with accuracy and point by Doherty.* "On introducing the finger into the vagina we find the hardness, so remarkable in the iliac fossa, has extended to the roof of the vagina, which is tender to the touch, and as firm and inelastic as a deal board—a condition which must immediately arrest our attention. Not the slightest impression can be made on it by our pressure, while we may observe that the uterus is bound down to the affected side, either throughout its whole extent, by which it suffers a lateral displacement, or only partially, so that the fundus is drawn in one direction, while the os tincæ is turned in the opposite."

An observation of Aran is important. He says small perimetric inflammatory swellings may have their seat in the sub-peritoneal cellular tissue; but the voluminous swellings are the result of perimetric peritonitis.

The subject of diagnosis may be appropriately concluded with the caution not to pursue it at the bedside with too much diligence. By instituting repeated and minute explorations it is very easy to do harm—more than enough to counteract any good which the knowledge thus derived may enable us to apply. Nothing in the treatment is so necessary as "rest" of the affected parts; and examinations mean disturbance.

The *treatment*, like that of metritis, must vary according to the types of the disease and its complications. If the result be puerperal metritis associated with septicæmia, the treatment of the perimetric inflammation is simply subsidiary to that of the puerperal fever. In the more purely inflammatory cases, whether post-puerperal or not, leeches, to the number of twelve or twenty, to the groins and hypogastrium, will generally be useful in the early stage. Fomentations or moist warmth applied by a large thick linseed-meal poultice or spongio-piline are of material service. In many cases I have seen leeches, calomel, and opium do good. A pill of one or two grains of calomel with half a grain of opium may be given every four hours for twenty-four hours; and then every six or eight hours for a day or two longer. If there is any disposition to diarrhœa the calomel may be reduced, and the opium increased. Or, in some cases, I have been better pleased with pills or powders consisting of three grains of grey powder and five grains of Dover's powder.

An obstacle to this and other treatment, however, often exists in obstinate nausea, hiccough, or vomiting. To subdue this symptom is the first necessity. Bismuth, hydrocyanic acid, pepsine, kreosote, ice, soda-water in various combinations, will be useful. To allay fever, the acetate of ammonia and nitrate of potash with a sedative answer best.

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* "On Chronic Inflammation of the Uterine Appendages occurring after Parturition." 1843.

In the more chronic stages, where there is no obvious process of suppuration or pointing, blisters applied to the groins and hypogastrium are often of great service. In the same stage iodide of potassium becomes extremely serviceable, and may be combined with bark in decoction or tincture.

The question as to opening abscesses does not seem to demand much discussion. Not seldom Nature solves it for herself. The abscess bursts into the rectum or roof of the vagina without obvious warning; and generally recovery progresses from that event. It seems to me that these are the easiest routes; that evacuation by them takes place earlier, and often with less disturbance. This may be partly because the walls of Douglas's pouch are thinner and more easily perforated than the abdominal wall. At any rate the pointing and perforation of the abdominal wall is often slow and painful. The progress of an abscess towards the skin generally makes itself visible by the growing prominence and puffiness of the tumour, its reddening, its fluctuation, and finally by the skin becoming blue and palpably thin. It is possible to err by opening an abscess too soon and too late. If an inflammatory tumefaction be punctured before fluctuation is made out we may fail to find pus; the incision must be carried deeply through tender vascular structures, and cause serious bleeding; and the suppuration-process will not be stopped. On the other hand, if we wait until the abscess is on the verge of bursting we shall have prolonged unnecessarily the patient's suffering; the blue skin may slough in spite of puncture, and will only heal with an ugly scar; and there is the risk of the abscess effecting an opening internally into the peritoneum or in some other direction as well. The proper time for opening an abscess pointing to the skin appears to me to be as soon as fluctuation is clearly ascertained. Incision may be made with a bistoury, or a Syme's knife; and a drainage-tube will be useful. The wound should not be allowed to close at once, as pus will continue to flow for two or three days at least. I think it is important to keep the cavity of the sac as small as possible, by adjusting compresses in such a manner as to bring the walls together.

If we find fluctuation in the roof of the vagina or in the rectum the same rule should be followed. The puncture may be made by a long sharp-pointed hernia knife, or by a long trocar—for the rectum the long curved trocar used for tapping the male urethra is very convenient. Where there is any doubt as to the presence of pus the fine aspirator-trocar is the proper instrument to use. It is sometimes an advantage to insert a drainage-tube in the case of opening an abscess by the vagina. An excellent and convenient drainage-tube will be found in the winged male catheter. It is easily inserted, by help of a stilet. Thus supported it is carried into the sac, where the end is retained by the wings. Sayre's coil drainage-tube answers well.

As a general rule, it is prudent, in the first instance, to tap any pelvic tumour suspected to contain pus or other fluid with the aspirator-trocar. In most cases the fluid, be it pus, serum, fluid blood, or the fluid of an ovarian cyst, can be more completely drawn off by the vacuum-process than by an opening by a bistoury. Thus, the aspirator-trocar, whilst superior as a diagnostic means, is often at least equally a therapeutical agent. And beyond this probable benefit of giving vent to discharge, it is a proved clinical fact that puncture of the indurated inflammatory masses hastens their removal.

When an abscess has been opened, and sometimes earlier, quinine generally becomes useful. The diet should be nutritious and supporting. Rest will still be necessary.

At a later period, when suppuration has ceased, quinine may still be useful; but iron now comes into service. The bowels must be kept gently acting. Bed may be changed in the daytime for the sofa ; and gradually, but watchfully, gentle exercise may be indulged in. If taken too soon, or exceeding moderation, it is always probable, so long as any marked intumescence or diminished mobility of the uterus remain, that a return of inflammation may occur.

In the advanced, or confirmed chronic cases, warm baths will render great service. The iron-waters are not always safe. I believe many experienced physicians have arrived at this conclusion. The best results I have seen have been derived from the Woodhall Spa. The most valuable medicine in these cases is cod-liver oil.

CHAPTER XXI.

PERIMETRIC HÆMATOCELE; RETRO-UTERINE HÆMATOCELE; PELVIC HÆMATOCELE; BLOOD-EFFUSIONS IN THE NEIGHBOURHOOD OF THE UTERUS; PATHOLOGICAL DISCUSSION; GROUPS OF CASES:—1. FROM RUPTURE OF UTERUS, GRAVID; 2. RUPTURE OF ECTOPIC GESTATION-CYST; 3. RUPTURE OF DISEASED OVARIES; 4. EFFUSIONS ATTENDING ABORTION; 5. EFFUSIONS FROM MENSTRUAL OBSTRUCTION; 6. FROM ALTERED CHARACTER OF BLOOD: OTHER CAUSES; SYMPTOMS AND DIAGNOSIS; COURSE; TREATMENT.

THE study of perimetric hæmatocele most conveniently follows immediately upon that of perimetric inflammation. Clinically, the two conditions have close relations. Indeed, blood-effusions into the peritoneum almost necessarily entail pelvic peritonitis. And at the bedside the practical difficulty often is to distinguish hæmatocele from inflammatory effusions. It is certain that until within the last twenty years, or less, cases of perimetric hæmatocele were confounded with inflammatory effusions or with retroversion of the uterus. It can hardly be said that hæmatocele had been recognized as a distinct affection. And even now many men are slow to admit the evidence upon which its existence is established, and are consequently unable to appreciate the frequency or the conditions of its occurrence.

In 1850 the disease was so little known that Malgaigne is reported to have attempted the enucleation of a supposed fibroid tumour of the uterus, which proved to be a collection of blood; and the operation was followed by a fatal issue. And Scanzoni says, in his work on *Chronic Metritis,* published in 1863:—"We regret not to be in a position from personal experience to speak of this disease, for in our certainly extensive and protracted observation we have not been able to diagnose peri-uterine hæmatocele in a single case."

So long ago, however, as 1831, Récamier described in the *Lancette Française,* under the name of "Tumeur sanguine du bassin," a very clear case. A woman, aged twenty-eight, after an abortion, had a large tumour formed in the pelvis, behind the uterus, which bulged the vagina forwards. Récamier believing it to be an abscess, opened it, but instead of pus, dark, half-coagulated blood escaped. The patient recovered.

Velpeau, in his *Médecine Opératoire,* 1839, published additional cases. He was evidently acquainted with the characteristic features of the pelvic blood-swellings.

In 1850 and 1851 Nélaton, in lectures in the *Gazette des Hôpitaux,* laid the foundations of the present more accurate knowledge of the subject. It was he who proposed the name "retro-uterine hæmatocele." From this date cases and memoirs, still chiefly emanating from the French school, rapidly multiplied; proving that it was only necessary to look for examples of this hitherto unknown affection with intelligence, in order to find them. Viguès, Fenerly, Aran, Prost, Bernutz, Puech, Nonat, Laborderie, Laugier, Voisin, Gallard, Richet, Goupil, and Trousseau, have all contributed important materials.

In England Tilt and West were the first to describe the affection. McClintock has given the best original account in the English language.* He had published a case in the *Dublin Hospital Gazette* in 1860. In 1861 Dr. Madge communicated to the Obstetrical Society a very complete report of a case, illustrated by figures, representing the conditions found on dissection, and commented by a valuable review of the subject. Dr. Tuckwell, in 1863, published an important memoir, entitled "On Effusions of Blood in the Neighbourhood of the Uterus." This contains an excellent historical sketch, a tabular view of ninety-eight cases collected from various sources, and histories of some original cases not before published.

In Germany contributions have been accumulating since 1859. C. R. Braun, Alfred Hegar, Säxinger, Seyfert, Olshausen, and others have added materially to the casuistical history of the subject.

Bernutz claims to have been the first to demonstrate by post-mortem examination the position and relation that these tumours hold to the uterus. He was the first to maintain that many cases directly depended upon retention of menstrual blood.

The Seat of the Blood-tumour.—The term "perimetric hæmatocele" is used to define the state of tumour formed by effusion of blood in the neighbourhood of the uterus. It is more comprehensive than "retro-uterine hæmatocele," which strictly means a blood-tumour behind the uterus. This latter term is correct as far as it goes. It would be altogether correct if it expressed the whole truth; that is, if blood-effusions were not liable to occur elsewhere than behind the uterus. But blood-effusions do occur in other relations to the uterus. To admit these into a general definition we want the term perimetric or peri-uterine hæmatocele; or perhaps the term "pelvic hæmatocele," proposed by Dr. McClintock, being more comprehensive, is better still.

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* "Diseases of Women," 1863.

If we start from the arbitrary definition which some have proposed, namely, to restrict the term hæmatocele to blood-effusions into the peritoneal cavity, it would almost necessarily follow that the adjective, retro-uterine, is the proper and only one to employ. For, if blood be poured out into the peritoneal cavity in the neighbourhood of the pelvis, it must gravitate to the retro-uterine pouch, which is the lowest part of the general cavity. The ante-uterine or utero-vesical pouch is so shallow, and is so liable to disturbance or obliteration, by the filling and rising of the bladder, that lodgment of fluid blood in this position is rarely possible. If a little blood were to find its way into this pouch it would probably soon be dislodged, and made to run over the fundus of the uterus and the upper edge of the broad ligaments into the pouch behind. Moreover, the most frequent sources of effused blood are the ovary and the extremity of the Fallopian tubes, and these parts being in the posterior wing of the broad ligament, blood from them naturally falls direct into the posterior pouch. Intra-peritoneal effusions then are almost always retro-uterine.

But is this all we have to consider? Are there no other blood-effusions? Adhering to the cardinal principle of this book, that of making scientific pathology subsidiary to clinical work, I have determined to bring together all the blood-effusions which may take place in the neighbourhood of the uterus; and then to proceed to analyze or differentiate them as best we can by the aid of the history and symptoms of individual cases and of general experience and pathological knowledge. It is only in this way that we can usefully investigate any given case. We may not know, in the first instance, what the source of the bleeding may be, or the particular nature of the lesion which led to it. That is a problem to be solved by clinical investigation. In a memoir on this subject* I distributed in groups all the cases I had met with which were characterized by the escape of blood in considerable quantity in the pelvic peritoneum. Some of these groups included cases which those who look at the subject from a rigorously special point of view refuse to recognize as legitimate examples of retro-uterine hæmatocele. But the objection, I submit, is critical, not practical. It seems unreasonable to contend that a case of rupture of the uterus, or of an extra-uterine gestation-sac, one of the almost certain effects of which is effusion of blood into the peritoneum, is not a case of retro-uterine hæmatocele. It is quite arbitrary to restrict the term to effusions of blood the result of one particular cause; for example, rupture of ovarian vessels. In no case is the outpoured blood the disease. It is only a consequence of some lesion or injury. In some cases the more immediately serious symptoms are due to the shock of the injury; in others to the loss of blood and the attendant shock. This difference is an accident; of clinical importance, it is true, but still not such a difference as to dictate absolute separation of the cases possessing so important a common feature as hæmorrhage.

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* "St. Thomas's Hospital Reports."

The clinical physician, indeed, must take even a wider survey. He must contemplate the probability of a given swelling behind the uterus, or apparently behind it, not being a blood-tumour. Numerous bodies occupy precisely the same locality and relations; may entail almost identical symptoms, subjective and objective. So in the first instance we are compelled to study all these conditions together; to analyze them if we would justify the hope of differentiating for the scientific purpose of pathology, or the practical purpose of treatment. In this spirit I have written a further memoir on "Retro-uterine Tumours"* in which I have brought together and distributed in groups some of the most strikingly illustrative cases which come under this general clinical description.

In all the cases of hæmatocele, the hæmorrhage, sooner or later, is a serious element. First, by the shock caused by the sudden impression of the outpoured blood upon the peritoneum; secondly, by the loss of blood; thirdly, by the consequent peritonitis. The patient may be destroyed by the shock alone, or by the shock combined with the loss of blood, before there is time for inflammation to arise. This is to say, that in those most formidable cases, as of rupture of the uterus, or of an extra-uterine gestation-sac, life may be extinguished before a hæmatocele, properly speaking, is formed. But this is no more than is true of those usually less fulminating cases, in which the blood proceeds from burst ovarian vessels. In these cases sometimes the shock and bleeding kill before a tumour can be formed by the segregation of the blood by inflammatory effusions. In all there are common features which bind them together as members of one clinical family.

Putting aside then for the present all pathogenic theories, we shall find that the cases of perimetric hæmorrhage may be arranged as follows :—

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* "St. George's Hospital Reports," vol. viii., 1877.

Peri-uterine Tumours (hæmatic).

- A. Intra-peritoneal (retro-uterine).
  - I. Non-encysted (cataclysmic).
    - 1. Rupture of uterus.
    - 2. „ of tubal or other ectopic gestation-cysts.
    - 3. „ of ovary.
    - 4. „ of sub-ovarian vessels, or from a uterine varix.
    - 5. Aneurisms.
  - (Wilks refers to intra-peritoneal effusions from liver and from heart-disease).
  - II. Encysted (peritonitic).
    - 1. Menstrual.
    - 2. Abortion.
    - regurgitant.
- B. Extra-peritoneal.
  - I. In the broad ligaments.
  - II. In cellular tissue between cervix uteri and bladder.
  - III. In cellular tissue between uterus and rectum.

I do not pretend that this is a rigorously exact classification. Hæmorrhage from rupture of an extra-uterine gestation-sac may become encysted; hæmorrhage from menstrual deviation may be cataclysmic. But if we regard the arrangement simply as a framework for description, it will be found useful in aiding to obtain a clear knowledge of the subject.

When blood is rapidly poured out in large quantities into the peritoneal cavity the shock and loss of blood alone, as we have seen, may kill. No opportunity is given for the establishment of the conservative process of inflammation which, by segregating the blood in one mass in one compartment of the peritoneum, limits both the quantity of blood effused and the area of irritation, and hence the extent of shock. In such a case the hæmorrhage is said to be "non-encysted." Looking at the terrible suddenness and severity of the blow struck at the vital powers, I have called these cases "cataclysmic."

The most common causes of the effusion in these non-encysted or cataclysmic cases are rupture of the uterus gravid or not gravid, rupture of a tubal gestation-cyst, rupture of a diseased ovary, or of a varix of the pampiniform plexus.

But in some cases where the hæmorrhage is due to one of these causes the blood does become encysted. The course they run resembles closely that run by the cases of the second order in which the source of the blood is the gorged vessels of the ovary, or the Fallopian tubes during menstruation or abortion.

And even in some of these latter cases the blood is poured out so rapidly that it does not become encysted. These too may be cataclysmic.

Instances of encysted hæmatocele resulting from ruptured extra-uterine gestation-sacs are reported by Voisin, Aran, and myself, and many others.

Nor can the extra-peritoneal cases be on sound clinical or pathological grounds separated from the intra-peritoneal cases. If we base our classification or definition on origin, we shall find that some of the same causes which lead to blood-effusions into the peritoneum may lead to blood-effusions outside the peritoneum into the perimetric cellular tissue. And more than this, we shall find cases in which the blood being first effused into the cellular tissue has burst its way through the peritoneum into the peritoneal cavity; thus breaking down the arbitrary barrier which theory had placed between the two orders of cases.

We see then from this statement that the perimetric blood-effusions are brought into close pathological and clinical relationship with the so-called "thrombus," or blood-effusion in the peri-uterine cellular tissue. It is this relationship which justifies the term "Pelvic Hæmatocele," proposed by Dr. McClintock. It is true some authors of deserved repute would exclude all but intra-peritoneal effusions. The objection to ranking extra-peritoneal effusions along with intra-peritoneal effusions has been insisted upon by Voisin and Bernutz. The latter author contends that the extra-peritoneal effusions are thrombi, and only result from labour. But the objection of Aran is more pointed, as being based on a clinical distinction. This excellent author affirms that there are no sub-peritoneal perimetric blood-tumours at all important in size, so as to come into consideration. They cannot become large because they are limited within the cellulo-fibrous layer covered in by the peritoneum. To this it may be answered that intra-peritoneal retro-uterine effusions are not always very large; and that small tumours of this description may be equalled in size by some extra-peritoneal ones, especially where complicated with inflammatory effusions, the extent of which can hardly be defined from the blood-effusion. And Huguier, Nonat, Robert, Becquerel, Verneuil, Prost, all maintain that hæmatocele may be extra-peritoneal. In some extra-peritoneal cases, Nonat says, the tumour is nearer the anus. Prost relates two well-authenticated cases, in one of which the blood was effused between the layers of the broad ligament, and in the other it occupied the connective tissue behind the uterus. Tuckwell cites Becquerel as relating a case in which more than two pounds of blood were found outside the peritoneum, the blood having dissected its way between the different organs, and displaced them all. A specimen, presently to be described, in Bartholomew's Museum, seems a clear example of large extra-peritoneal hæmatocele.

If we look to the source of some intra-peritoneal effusions, we cannot fail to see that the effusion into the peritoneum is accidental, that the blood would be quite as likely to make for itself a sac in the cellular tissue of the broad ligaments. For example, a varix or the dilated pampiniform plexus may be supposed to give way without rupturing the peritoneum, the blood finding a lodgment by separating the peritoneal investments of the broad ligament.

Olshausen (*Arch. für Gynäkol.*, 1870) relates a case of sub-peritoneal *ante-uterine* catamenial hæmatocele following on acute dysmenorrhœa. Fever, absorption, and recovery ensued. The anterior lip of the os uteri was short, whilst the anterior vaginal roof was driven backwards by a tumour of half-soft consistence.

I have seen two cases which I believed were examples of ante-uterine hæmatocele, probably extra-peritoneal, since they corresponded in relations to the thrombus which forms in front of the uterine neck during labour. Both cases came under my observation in the chronic stage; in both there was a firm tumour, the size of a small orange, in front of the uterus, throwing the fundus uteri backwards. The diagnosis was confirmed by the gradual complete disappearance of the tumour, without any signs of rupture or suppuration. These cases meet the objection of Aran that extra-peritoneal blood-tumours cannot be large enough to enter into clinical consideration. Professor G. Braun relates (*Wien. Med. Wochenschr.*, 1872), a case—he thinks the only one—in which ante-uterine intra-peritoneal hæmatocele was diagnosed during life. A married woman, aged thirty-five, had a smooth elastic swelling in front of the uterus. Dieulafoy's trocar gave issue to a pint of dark-red blood. Collapse and death followed. A sac, the size of a fœtal head, was found in the left side of the pelvis, in front of the uterus. There was also peritonitis.

Tuckwell found in the synopsis of cases made by him that the blood was found to be intra-peritoneal in thirty-eight out of forty-one post-mortem examinations; that in twenty-six of the thirty-eight it was diffused, and in twelve circumscribed, and limited to the retro-uterine cul-de-sac. I have seen several cases of extra-peritoneal hæmatocele verified by puncture. There is an excellent specimen in St. George's Museum.

We are then drawn to the conclusion that there are cases of both kinds; but that the intra-peritoneal blood-effusions are by far the most common, apart at any rate from pregnancy and labour.

Admitting that for clinical purposes we want not alone a comprehensive view of all pelvic blood-tumours, but also a comprehensive view of all pelvic tumours which by location, relations, or symptoms resemble blood-tumours, it will be useful in this place to give a grouped arrangement of the non-hæmatic tumours. The following table is drawn from the memoir on retro-uterine tumours referred to:—

Retro-uterine Tumours (not Hæmatic).

I. Retroversion of the uterus.
  a. Gravid.
  b. Non-gravid.
II. Ectopic gestation-cysts.
  a. Tubal.
  b. Abdominal.
III. Ovarian cysts.
IV. Dermoid cysts.
V. Cystic tumours of broad ligaments.
VI. Cystic enlargement of Fallopian tubes.
VII. Retro-uterine or peri-uterine inflammatory deposits or abscess.
VIII. Uterine fibroids.
  a. Loose.
  b. Projecting from hinder wall of uterus.
IX. Malignant tumours.

Perimetric hæmorrhage may occur in the pregnant state and in the non-pregnant state; and in either case the effusion may be intra-peritoneal or extra-peritoneal. It does not fall within the scope of this work to describe the accidents of the pregnant state. But some of the conditions of uterine pregnancy, and more especially those of abnormal pregnancy, are so connected with the history and diagnosis of perimetric hæmatocele that no complete idea can be formed of the subject, if we exclude the blood-effusions of pregnancy from the discussion. An all-sufficient reason for taking these into account is that in many instances we cannot know at the time of the accident what the source of the hæmorrhage is, or whether the subject is pregnant or not.

The *pathology of intra-peritoneal hæmatocele* is well illustrated in the following cases. Olshausen relates* the case of a woman, aged twenty-five, who was delivered in March, 1863, of her first child. Menstruation returned regularly until the middle of September. In the middle of October it returned too early, and with repeated pain in the belly, and vomiting. Thenceforward metrorrhagia lasted for seven weeks. She walked into the physician's room. There was frequent desire to micturate. In the median line of the abdomen was a ball-shaped, somewhat painful tumour, the size of a gravid uterus at three months.

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* "Archiv für Gynäkologie," 1870.

The os uteri was driven against the symphysis pubis; behind it was a ball-shaped, slightly painful elastic swelling, filling the hollow of the sacrum. The tumour became less in bulk, and harder. She died in June, 1864, of typhus. At the autopsy adhesions were found in Douglas's space, especially behind the broad ligaments. A membrane extended from the point of insertion of the left broad ligament to the cervix uteri backwards to the rectum, dividing off a small portion of the retro-uterine pouch; in this a small coagulum remained, containing fluid in its centre. It lay quite free. The space showed a remarkable pigmentation abruptly terminating above, yellow and black in the tissue of the peritoneum. Both ovaries adhered to the uterus.

The anatomical illustrations in the London museums are few. Amongst the most striking is one in St. Thomas's, a representation of which is given in Fig. 108.

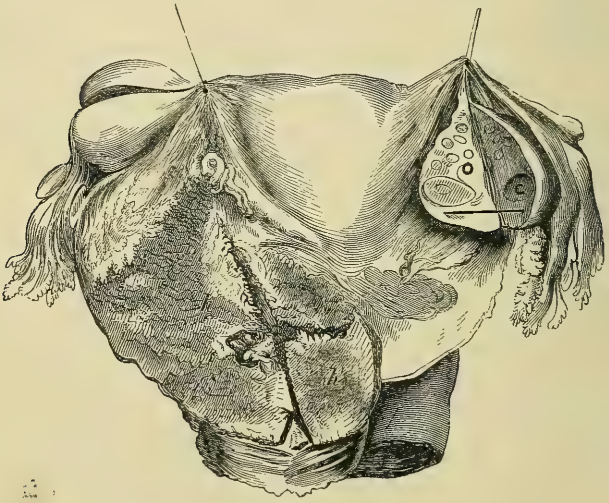

FIG. 107.—(From Guy's Museum, half-size.)

REMAINS OF A RETRO-UTERINE HÆMATOCELE (R. B.).

o. The right ovary laid open. *h*, *h*. The roughened peritoneum of Douglas's pouch, which formed the anterior wall of the sac of the hæmatocele.

There is a very interesting specimen in Guy's Museum (Fig. 107). It is not described in the catalogue. It shows the remains of a blood-cyst, *h*, *h*, behind the uterus in Douglas's pouch. The area involved behind the left broad ligament and the left of the uterus further illustrates the anatomical relations of Douglas's sac which I have described. The peritoneal surface is roughened by inflammatory deposits tinged with blood-débris.

There is a specimen in St. Bartholomew's Museum of special interest (No. 31.36) thus described: "Uterus and appendages. Between the layers of the right broad ligament is a globular cyst, about as big as a walnut, whose walls in the recent state were seen to be formed by the separated layers of the ligament, and whose cavity was filled with quite recent blood coagula. On the anterior aspect of the cyst were two small, recently formed irregular openings.

"From a patient, aged twenty-five, who, while in the hospital for treatment of warts on the vulva, was suddenly attacked with symptoms of internal hæmorrhage, and died in twelve hours. Post-mortem: The cavity of the peritoneum contained five pints of recently shed blood, loosely coagulated; and dark fluid blood oozed slowly from the openings in the cyst above described. The interior of the uterus, along with all the other parts of the body, was very pale. Careful examination failed to discover the source of the hæmorrhage. No evidence of extra-uterine pregnancy, no ruptured vessel was discovered. It is uncertain whether the patient was menstruating at the time of the attack."

The nature of the cyst in the broad ligament is not clear. Was it a simple cyst, such as is not unfrequently seen in this situation? If so, how can we account for its becoming filled with blood? Is it a true extra-peritoneal hæmatocele, resulting from rupture of a vessel in the broad ligament, the sac subsequently bursting, and giving rise to a cataclysmic intra-peritoneal effusion? This seems to be the more probable conjecture. At any rate, the specimen gives anatomical demonstration of the possible existence of extra-peritoneal hæmatocele.

The following case from Olshausen affords distinct evidence of the genesis and nature of the affection. Atresia of the vagina after typhus; hæmatometra and hæmatocele; death by peritonitis; regurgitation of blood through the tubes. When the subject came under treatment fluctuation was felt by rectum. Puncture made by rectum let out a little thick blood. Two days later at stool a larger quantity was voided. Peritonitis and death quickly followed. On dissection diffuse peritonititis, with copious purulent exudation, was found. Blood-remains were seen in Douglas's pouch. The uterus was much enlarged; its cavity empty. Both tubes were much dilated, darkly pigmented inside, chiefly towards the uterine ends. Both ostia uterina allowed a sound to pass easily. The left ovary contained several small cavities filled with blood; it adhered to the uterus.

Dr. Jüngel told Dr. Ferber that in about 3,000 minute dissections of women he had never found hæmatocele or remains. On the other hand, obvious remains of pelvi-peritonitis, and of slight pigmentation of Douglas's pouch were very frequent. In *puellis publicis* pelvi-peritonitis of old or recent date was always found, but never hæmatocele.

Since pigmentation is probably the residuum of blood, the presumption is that small hæmatoceles are not unfrequent. It is certain that adhesions often disappear so as to leave scarcely a trace behind.

Heurtaux describes the following *contents of a hœmatocele:* 1. Droplets like oil of a brown-yellow colour; 2. Spherical cells entire or reduced to fragments, abounding in adipose nucleoli; 3. Amorphous fragments of hæmatoidine; 4. Quadrilateral crystals, resembling ammonio-magnesian phosphates; 5. Some blood-globules, well coloured; 6. An extraordinary quantity of blackish corpuscles, of various forms, resulting from the alteration of the colouring matter of blood. Dr. Madge describes the contents in his case as consisting of blood-corpuscles, some perfect, others undergoing various degrees of change; also pus-globules and little black and yellow masses, some of them assuming a crystalline form; the chief part, however, was made up of undefinable *débris* of blood, fibrine, and pus.

The Sources of the Blood-effusions.—The seat of the blood-effusion being not constant, it almost necessarily follows that the source is not constant. I propose to enumerate the various sources to which the hæmorrhage has been traced. This review will throw considerable light upon the subject. In the first place, we may state generally that blood may be poured out from the ovaries, the Fallopian tubes, the uterus, and from the broad ligaments; in the second place, it may proceed from an extra-uterine gestation-sac, ovarian, tubal, or abdominal; in the third place, it may proceed from lesion of some abdominal structure, as aneurism of the aorta, or of the mesenteric arteries.

Group I.—In *ordinary uterine pregnancy* the uterus may rupture at any time. H. Cooper* relates a case of rupture of the gravid womb in the third month. At subsequent periods rupture becomes progressively more frequent. In almost all, if not in all, cases of rupture during pregnancy, the rent is through the body of the uterus; and therefore the blood escapes into the peritoneal cavity, the ovum or embryo being either retained in the uterus or expelled into the peritoneum. In the first case, there is strictly intra-peritoneal hæmorrhage. In the second, there is intra-peritoneal hæmorrhage, complicated with the presence of the embryo and ovum. In either case the blood may or may not coagulate, and become encysted. The more likely event is that it will not become encysted, but that the patient will die of the shock.

The blood rarely coagulates more than partially; remaining liquid, it is diffused over the intestines, only a portion being able to settle in the pelvic cavity; the conservative peritonitis which under more favourable circumstances secludes the blood in the pelvic region by plastic effusions cannot take place. It does not, in technical language, become "encysted." It therefore does not form a tumour: it is not a "hematocele." It is the most severe form of intra-peritoneal hæmorrhage, resembling the bursting of an aneurism. It is a cataclysm of blood, not a slow or gradual effusion. In this respect, but differing in some of its symptoms, cases of rupture of the gravid uterus resemble those in the next group, in which the cyst of an extra-uterine gestation bursts.

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* "British Medical Journal," 1850.

Group II.—In *abnormal or ectopic pregnancy*, rupture of the fruit-sac is a much more frequent issue; and this at so early a period that the existence of pregnancy may be unsuspected or doubtful. This subject has been treated of in some detail in a special chapter. It is only necessary here to call to mind, 1st, that the bursting of an abnormal fruit-sac is often preceded by metrorrhagia, resembling in this respect the more typical cases of intra-peritoneal hæmorrhage, in which the blood flows from the ovary or Fallopian tube; 2ndly, that the severity of the injury, the quantity of the blood effused, and the rapidity with which it is poured out, induce such a degree of shock that the blood rarely becomes coagulated and encysted, so that the case, like that of rupture of the gravid uterus, is "cataclysmic." Still in some cases there is reason to believe that the blood may coagulate, become surrounded by plastic effusions, and constitute a true hæmatocele.

The following case, in which the diagnosis was verified by post-mortem examination, shows the possibility of a true hæmatocele forming as the result of rupture of a tubal gestation-cyst: — *Fallopian Gestation — Pelvic Hæmatocele — Death — Autopsy.* In 1867 I met Mr. Swales and Mr. Jaap, of Sheerness, and Dr. Jardine, of Chatham, in the case of Mrs. J. Being presumed to be two months pregnant she had been taken with abdominal pain and flooding, but got better. On the 26th November, being out at dinner, she was seized with acute abdominal pain, prostration, and was with difficulty got home. The following day she was much worse: vomiting, hiccough, tympanitis; urine not retained.

The case had at first been taken for retroversion of the uterus, as the os was near the pubes, and low down, and a swelling was felt behind the os, simulating the body of the uterus. I passed a catheter into the bladder; there was no obstruction. *Per rectum:* there was a firm swelling in the roof also felt by the vagina. The os uteri was open, admitting the tip of the finger; it was pointing downwards. The sound curved entered nearly an inch beyond the normal length in a forward direction, over the symphysis: the swelling behind was, therefore, not the uterus. The uterus was fixed rather low in the pelvis, and driven forwards by the mass behind.

The sickness and pain abated somewhat, but otherwise there was no amendment. The patient died under the shock and loss of blood on the 30th. Mr. Jaap wrote to inform me that a "post-mortem was performed on the 2nd December by Mr. Swales, assisted by the staff-surgeon of the dockyard and Mr. Keddell. It must be a melancholy source of gratification to you to know that your diagnosis was verified in every iota." Mr. Swales communicated the following: "The body was completely blanched; I was shown what was called an adhesion between the left Fallopian tube and the intestines which had been cut away; it certainly was not an adhesion, the product of peritonitis, about the thickness of the thumb; it was more like half-organized fibrin; the Fallopian tube had been ruptured, in my opinion, at the point to which this so-called adhesion had been attached; the uterus was very pale, enlarged; all the other organs healthy; an immense amount of coagulated blood was packed in among, and almost covering the uterus and other pelvic contents, besides which there was a large quantity of serum. No ovum was found. I formed the opinion that it was a case of arrested ovum in the Fallopian tube which had escaped into the peritoneum; but that she died more from the internal hæmorrhage than from inflammation."

Group III. Rupture of diseased ovaries.—This appears to be a very frequent source of the severer forms of intra-peritoneal hæmorrhage. Cystic ovaries of all sizes may rupture. In some cases the fluid effused in chief proportion is that proper to the cysts, the amount of blood being inconsiderable. In other cases, the large vessels in the walls of the cysts may be torn, so that hæmorrhage may be great. In yet other cases, there may escape both blood in considerable quantity, and viscid or puriform matter from the cysts. In the latter cases, the blood effused being mixed with a peculiarly irritating fluid, peritonitis is sure to ensue if the patient survives the first shock of the injury. This peritonitis naturally tends to segregate the effused matters; but the segregation is rarely so complete as in cases where blood alone is effused. The peritonitis often takes the lead as the more urgent disease, and is commonly the immediate cause of death.

Rokitansky describes as one source of the blood in hæmatocele the bursting of cysts of the ovary formed of distended follicles into which blood has been extravasated.

In those cases where the blood-effusion predominates, the symptoms and consequences resemble those of rupture of tubal gestation-cysts. There is at first preponderance of shock over anæmia; and the encystment of the blood is rarely complete. But in a case which came under my care in St. Thomas's Hospital, and which I have related in detail in the memoir above referred to, complete encystment did take place. It thus connects the series very distinctly with the classical retro-uterine hæmatocele.

As the case is made complete by a post-mortem examination, and is illustrated by the preparation preserved in the museum, and by a diagram, I think it desirable to reproduce it.

Retro-uterine Hœmatocele from Rupture of a Diseased Ovary—Puncture — Death — Autopsy. Condensed from Report of Dr. Seaton, Resident Accoucheur.—M. A. C., aged thirty-six, married, having eight children, was admitted into St. Thomas's Hospital, June 13th, 1870, under Dr. Barnes. She had been attending as an out-patient, and as she had had some difficulty in passing her water he deemed it advisable to take her in. The history she gave was that six months ago she was taken suddenly with pain in the stomach whilst engaged in washing, and that this happened at a menstrual period.

The difficulty in micturition had lasted for about three weeks, and it had now become so great as to necessitate the employment of the catheter. On examination *per vaginam* this retention was found to be due to a tumour occupying a median position in the posterior wall of the vagina, in feel resembling the retroverted gravid uterus. The os was high behind the symphysis; the sound passed upwards and forwards, over the symphysis, showing that the uterus was compressed bodily forwards, and was distinct from the tumour.

June 28th.—As the hectic condition persisted, indicating that blood-poisoning was progressive, Dr. Barnes punctured the tumour, which was now distinctly fluctuating. A fine trocar was thrust into the most depending part of the tumour. There flowed away about two ounces or more of dark treacly fluid, like retained menses. After the operation the tumour was found to have become flattened instead of forming a bulging prominence as before.

During the six succeeding days the pulse rose to 120 to 150, and more, the temperature to 103·6°, falling to 101° on the last day, when she sank, pain and vomiting having persisted.

The autopsy was made on the following day, and confirmed the diagnosis. The fundus uteri was pushed forwards above the symphysis; behind it was a tumour, semi-fluctuating, which was opened by slight manipulation, and then showed masses of partly coagulated, partly fluid blood, and some bubbles of air. This blood was contained in a cyst, bounded above by the intestines, in front by the posterior wall of the uterus, behind by the anterior wall of the rectum, and below by the floor of the pelvis and the depressed posterior wall of the vagina. The cyst walls were formed by peritonitic plastic matter. The relations and extent of the tumour will be seen by the diagram (Fig. 108), which, with the assistance of Mr. Stewart, the curator of the museum, and of Mr. Denison, librarian, I have constructed from the preparation and my notes of the examinations made during life. No trace of the right ovary could be discovered, unless a smooth serous-looking cyst, projecting from and opening widely into the main cyst, were the remains of it. At this point was firmly adherent a clot of blood. It seemed to be the source of the hæmorrhage; and it was concluded that the case was one of diseased ovary which had burst, discharging blood into the retro-uterine pouch, probably gradually at different intervals. The course of the trocar was traced by small punctured wounds; it penetrated the lower posterior wall of the vagina, then a small duplicature of the rectum before entering the cyst. In another case which came under my care, a post-mortem examination showed that the source of the blood was a cancerous ovary. The blood was encysted. I have seen a similar case with Mr. Curling in a woman aged forty. The right ovary, of the size of a large

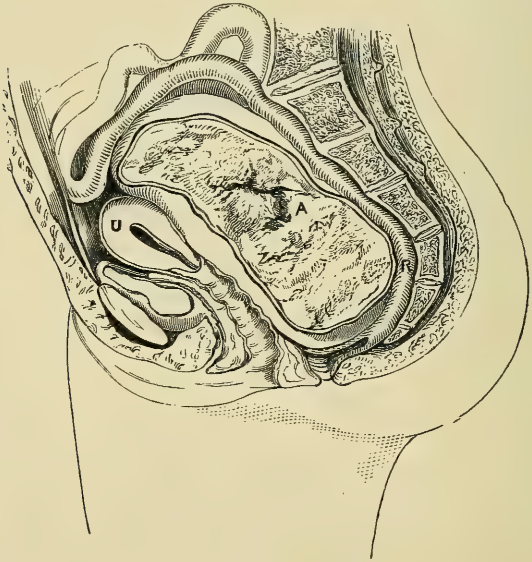

Fig. 108.—(DR. BARNES.) St. Thomas's Hospital Museum.

REPRESENTING A RETRO-UTERINE HÆMATOCELE FROM A DISEASED OVARY (R. B.).

U. The uterus pushed forwards. A. The hæmatocele filling the cavity of the sacrum, bounded above by plastic effusions and the small intestines.

walnut, in cystic degeneration, had burst. The preparation was examined at St. Thomas's Hospital.

Group IV. Effusions of blood into the peritoneum attending abortion.—During abortion, if there should be any obstruction to the free escape of the blood from the os uteri, it is not improbable that, under the extreme tension of vessels from increased turgescence, escape may take place by the Fallopian tubes into the peritoneal cavity. These cases naturally follow in order upon Group II. The symptoms are generally less severe; but they are more severe than those attending ordinary cases of impeded menstrual function.

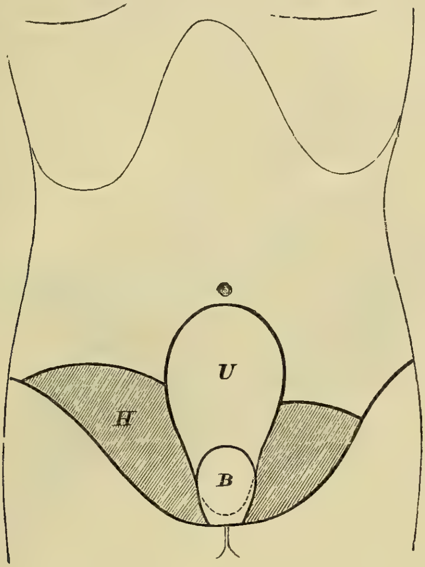

Fig. 109.

RETRO-UTERINE HÆMATOCELE (R. B.).

U, the enlarged uterus lifted up and pushed forwards by H, the retro-uterine hæmatocele. B, the bladder.

The following case was very carefully observed; it is a good illustration of retro-uterine hæmatocele following on abortion:—

Abortion — Pelvic Hœmatocele — Recovery.—On the 19th October, 1867, I met Mr. Burton, of Blackheath, in the case of a lady, aged forty-two. She had her last child three years ago; labour natural. Since then Mrs. C. has menstruated regularly, not in excess; no metrorrhagia until July and August last, when two periods had been missed. Six weeks ago, when away from home, she had a profuse loss which was taken to be an abortion. Since then she has suffered hypogastric pain, not so severe as to confine her to bed; at times there have been difficult micturition and constipation. She has had an attack of jaundice, now passing off; no marked fever or hectic. A firm rounded tumour rises to the umbilicus, defined by touch and percussion; it is continuous with a firm swelling passing into the left ilium. The os uteri is soft, a transverse slit compressed close behind or rather above the symphysis pubis; behind the cervix is a large rounded firm but not hard swelling filling the brim of the pelvis, and partly projecting into the cavity, depressing the roof of the vagina; this is also felt *per rectum;* it is more developed in the right ilium. The sound gently curved passes three and a-half inches to the fundus of the uterine tumour, by directing the point well forwards round the symphysis towards the umbilicus. The uterus, therefore, is in front, enlarged, and is insulated from the larger mass behind it; the uterine neck is pushed forwards and upwards against the pubes by the swelling, and the body of the uterus is carried upwards so that it is lifted quite out of the pelvis. Hence the apparent large size of the uterus, which seems to be as great as the uterus at four months' gestation.

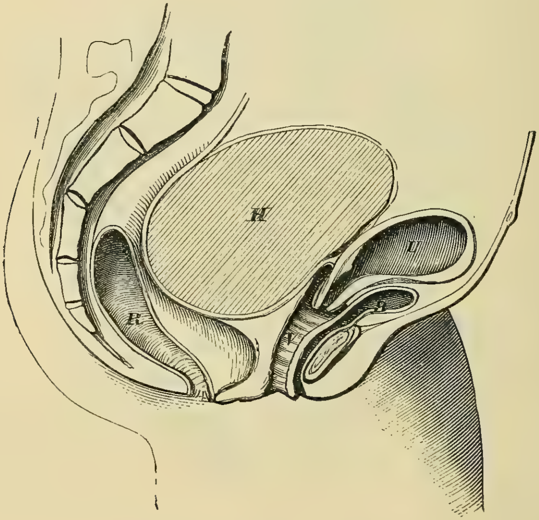

Fig. 110.

SECTIONAL VIEW OF THE PARTS (R. B.).

H. The hæmatocele fills the space between the uterus and the rectum, and descends into the pelvic cavity. U. Uterus. B. Bladder. V. Vagina. R. Rectum.

Diagnosis: retro-uterine hæmatocele; hæmorrhage beginning with abortion. Prognosis favourable. Treatment: rest.

The extra-uterine mass gradually disappeared, the uterus recovered its normal size, position, and mobility.

The condition of things is indicated in Figs. 109 and 110, constructed at the time the case was under observation.

The following is another case in which a discharge of blood *per rectum* confirmed the diagnosis:

Abortion—Retro-uterine Hœmatocele—Recovery.—On the 6th October, 1868, I met Mr. Garman, of Bow, in the case of Mrs. C. B., aged thirty-four, who had had one child fourteen years before. Has had several abortions. At the time of my seeing her she seemed to have recently aborted; the uterus was three to three and a-half inches long; cervix patulous; some hæmorrhage; the sound penetrated in normal direction.

November 1st.—We met again. Within the last week there has been rapid increase of abdomen; sense of weight and forcing forward of womb upon the pubes; pulse 90; no marked abdominal pain, but there is a solid mass the shape of the uterus rising to the umbilicus; dulness on percussion is uninterrupted from umbilicus to pubes. *Per vaginam:* fundus vaginæ depressed, the posterior wall bulging forward from pressure of a semi-elastic mass behind and above; the cervix and os uteri are pressed down and forwards close to the pubes; the os is flattened to a narrow chink. The sound—an elastic bougie—passes three inches forwards and upwards towards the umbilicus. *Per rectum:* a semi-elastic rounded mass is felt filling the hollow of the sacrum.

Diagnosis: pelvic hæmatocele following abortion. Treatment: rest, opiates.

In February, 1869, I received the following account from Mr. Garman: "Soon after your last consultation with me Mrs. B. passed a large quantity of blood *per rectum*, which very much relieved her. The womb has gradually assumed its proper position. The catamenia appeared for the first time ten days ago, and lasted the usual time, five days, a healthy and natural discharge. She is now convalescent."

Group V. Menstrual disturbance or difficulty, leading to effusions of blood into the peritoneum.—This group includes by far the largest proportion of cases. At the same time the danger is usually less, and the symptoms are not so severe. It may be stated as a general rule, that whenever there is any impediment to the free discharge of the menstrual blood by the natural route, if the quantity of blood exuded in the uterine cavity be excessive, or suddenly increased by accident, by emotion or other causes, escape may take place by the Fallopian tubes into the peritoneum.

We thus get sub-groups containing—

1. Cases of probable very early Fallopian gestation and escape of ovum into the peritoneum.

2. Cases in which there existed a mechanical impediment to the natural escape of the menstrual blood.

3. Cases in which there was disturbance or interruption of the menstrual flow from—

   a. Cold and over-exertion.
   b. From emotion.
   c. From excessive sexual intercourse.

4. Cases in which the hæmorrhagic character of the blood was increased by disease.

Nélaton and Laugier insisted that a great cause of hæmatocele consisted in the physiological work of ovulation, blood being poured out from the ovary at the seat of rupture. They enforce this theory by observations which show that in many cases the first appearance of the hæmatocele coincides with a menstrual epoch; that it is especially at the return of the menstrual epochs that the gradual augmentations of the hæmatoceles take place; that the pain of menstruation and hæmatocele have the common character of pain in the side of the pelvis, where ovulation takes place; and that the rut in animals may cause an ovarian congestion followed by rupture of this organ, that is to say, accidents similar to those of retro-uterine hæmatocele.

Gallard* gives another explanation of catamenial hæmatocele. He contends that Laugier has exaggerated the importance of ovarian congestion in putting it forward as the principal cause. It is true, indeed, that it always acts, but by itself it is incapable of producing a hæmatocele. Gallard, not denying the efficacy of other causes, insists that the principal cause of spontaneous hæmatocele is the dehiscence of an impregnated ovule. According to this view these hæmatoceles should be regarded as true extra-uterine gestations. This theory would, to a certain extent, explain the frequency with which hæmatoceles are caused by coitus. Trousseau even thought that in these mild cases of menstrual hæmatocele there was no peritonitis; such is their benignity. They are almost indolent. But Bernutz describes a case in which the hæmatocele became encysted in thirty-six hours.

Dolbeau, again, says retro-uterine hæmatocele is a grave complaint, but is rarely fatal. A case related by Sireday which occurred under the observation of Aran proves that the blood may coagulate in the pelvic region without setting up peritonitis at all. This woman presented symptoms of intra-abdominal hæmorrhage, but no trace of retro-uterine tumour could be detected by internal examination during life. Again, experience of ovariotomists shows that blood may be effused into the peritoneal cavity without exciting inflammation.

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* "Mémoire sur les hématocèles peri-utérines spontanées," 1858.

Dissections demonstrate that adhesions binding the uterus to the rectum and neighbouring parts may last for a considerable time, and that these remains are marked by pigmentation from hæmatoidine. In one case—it is recorded in this chapter—the fundus uteri was tied down in retroversion for some months.

The blood may flow back from the uterus and tubes, and escape by the abdominal opening of the tubes under various conditions. The chief of these are obstruction of the tubo-uterine canal, and sudden excessive effusions of blood into the tubes and uterus, so that the whole is unable to flow onwards by the vagina and vulva.

The most indubitable cases of obstruction of the tubo-uterine canal are those of atresia, congenital or acquired, of the vagina or cervix uteri. They have been described by Bernutz; and are discussed in this work under the head of "Atresia." The blood escapes into the peritoneum either by regurgitation by the abdominal end of the tube, or by the bursting or perforation of the tube. Ruysch, Haller, and Brodie, all believed that blood, menstrual or lochial, could flow back from the uterus into the peritoneum. Trousseau held the same opinion. Basing upon his aphorism that "all physiological blood comes from mucous membranes," he contends that the blood in metrorrhagia and abortion is simply blood in excess from the same source. Copious exudation of blood from the mucous membrane of the uterus and tubes, appearing as metrorrhagia, is, indeed, one of the most constant facts in the history of the affection. Where this outpouring of blood is in excess of what can be readily discharged by the vagina, it is easy to understand that some may be driven back by the tubes. The mechanism by which this is effected, is probably the same as that by which I have explained the propulsion of fluids injected into the uterus along the tubes. The uterus being suddenly irritated by the invasion of a quantity of blood beyond its capacity to tolerate, contracts spasmodically, and the fluid blood is propelled towards all the three openings from its cavity. This is borne out by the history of cases. The origin of hæmatocele is often marked by the initial fact of a strong emotion, or physical shock, producing a sudden afflux of blood to the pelvic organs, followed by intense uterine pain, and then by pain of wider diffusion. Bernutz's theory of *reflux* is essentially similar to the above. The case quoted at p. 599 from Olshausen is a good illustration.

But obstruction and retention of menstrual fluid need not be complete in order to lead to retrograde escape by the Fallopian tubes. In the chapter on "Dysmenorrhœa" I have drawn a comparison between cases of complete and of incomplete retention, showing that the difference between them is one of degree rather than of kind. Similar consequences may be expected to attend upon similar physical conditions. Accordingly we find that the narrow os externum uteri, which is so frequent a cause of dysmenorrhœa by retention, may lead to pelvic hæmatocele.

Trousseau has further expressed his opinion that obstruction from retroflexion of the uterus may lead to hæmatocele.

The following case seems to me to be one of retrograde flow from stenosis of the uterus:—In August, 1871, I saw, with Mr. Cass, a young lady who had had no child, but who was said to have had an abortion. She had been losing blood for a month. When under exposure and fatigue from travelling, and there was reason to conclude also from undue sexual excitement, she was seized with pain in the pelvis which rapidly increased. This was followed by retention of urine. When we met this had lasted three or four days. The pulse was 100, there was pain on pressure above the symphysis, and in both groins. There was an area of dulness on percussion, and of firm tumefaction rising to the level of the umbilicus, and extending into either iliac fossa. The uterus was pushed close behind the symphysis, the sound passed forwards, demonstrating that the fundus projected about two inches above the symphysis pubis. The os was small, the cervix conical, presenting the characters usually associated with dysmenorrhœa and sterility. Behind the uterus, occupying the brim of the pelvis, and extending into the hollow of the sacrum, was a smooth elastic swelling. This was also felt by rectum. She had been leeched, and there was a blister on the abdomen. There had been vomiting. Constipation. Diagnosis: retro-uterine hæmatocele, and consecutive pelvic peritonitis. We agreed upon sedatives and rest, and to puncture the tumour if the pulse rose. On the next day she was sensibly worse; there was more pain in the abdomen, and more diffused pain came on rather suddenly. The bladder now seemed relieved from pressure, for the urine was passed spontaneously, and the tense fluctuating mass behind the cervix uteri was lessened. The uterus, in fact, was found less tightly jammed against the symphysis. The pulse was 130; respiration, 36; temperature, 102° F. The symptoms indicated a fresh shock; and as the tension of the tumour was less, we did not use the trocar as contemplated. Under opium, the pulse respiration and temperature went down next day, and she was altogether easier. At this time I was absent from town, and Mr. Cass subsequently gave me the following report:—"The tumour and symptoms subsided greatly, when on the 20th, menstruation impending, fresh swelling and great pain set in, and Mr. Spencer Wells saw her. He punctured by the vagina; a pint and a-half of fluid blood flowed; the canula was kept in. For three days the discharge went on. When the canula was removed there was great pain. The swelling and pain again subsided, and after a long illness she recovered."

Under the hyperæmic turgescence attending the onset of the first ovulation and the attendant menstrual flux, there is a rapid transudation of blood from the mucous membrane of the uterus. This organ, comparatively immature and unused to the duty it is called upon to perform, does not readily expand to accommodate the blood poured into its cavity, and which is retained by an imperfect development of the cervix from being discharged by the natural outlet. There is consequently reflux along the Fallopian tubes, hæmatocele, and peritonitis. There can scarcely be a doubt that this is the explanation of some, at least, of those apparently obscure attacks of peritonitis which sometimes seize young girls at their entrance upon the ovarian epoch.

The following case of menstrual hæmatocele was observed to the end under such favourable circumstances as to furnish a good clinical illustration. L. H., aged thirty-five, was admitted into my ward with retention of urine on the 1st of October, 1871. She has had four children and one abortion. The catamenia have been irregular for eighteen months. There is now metrorrhagia. The uterus is driven forwards behind and above the symphysis by a mass behind which fills the pelvis. The os uteri is wide, gaping; the sound goes three inches above the pubes. The mass is fixed in the brim of the pelvis, projecting somewhat above the plane of the inlet. Her history is, that five weeks ago, having been menstruating three days, she was seized one afternoon with intense pain in the lower part of the abdomen. She kept her bed ten days, then became an out-patient until her admission. Early on the morning of the 7th a considerable flooding occurred. The pulse was weak, 74, temperature 99·5° F. After this the bladder was relieved naturally. On examination I passed a sound three inches through a hole I felt in the upper part of the vagina, behind the uterus; the point moved freely round. It was in the cavity of the hæmatic cyst. By speculum we saw the hole, and blood oozing from it. From this time she continued to improve; the tumour lessened rapidly in bulk; so that on the 24th there was very slight discharge, the opening had nearly closed, and the uterus had retreated to its normal position. She was again made an out-patient; and we had several opportunities of seeing the scar left by the healing of the opening by which the blood-tumour had discharged its contents. The uterus continued bound down in retroflexion for some months. The adhesions were gradually overcome by wearing a Hodge-pessary. I have since seen several similar cases equally complete.

Several curious examples have been recorded of hæmatocele resulting from dilatation of a tube where there was a double uterus. M. Decès relates a case of double uterus and vagina, in which the left vagina was imperforate; there was accumulation of menstrual blood, consecutive dilatation of the left uterus and tube, and death from rupture of the tube.

Group VI. In which the hæmorrhagic disposition is increased by disease.—The influence of variola, as of other zymotic diseases, in disposing to hæmorrhage, is well known. Where there is a normal hæmorrhagic molimen, as from the uterus and tubes during menstruation, if a zymotic disease supervene, the normal flow is apt to become hæmorrhagic. Barlow published a case of pelvic hæmatocele supervening on purpura (*Edinburgh Monthly Journal,* 1841); Scanzoni one of hæmorrhage arising during measles. Hélie and Laboulbène describe cases, the first of variola, the second of scarlatina, in which large clots were found in the uterus, and the Fallopian tubes were distended by blood coming from the uterus; but there was no blood in the peritoneum. These two cases are cited by Bernutz to show that the blood forms in the uterus, and may flow back into the peritoneum. The hæmorrhagic tendency induced by small-pox is illustrated in a case related by Bouillaud. A patient in La Charité, suffering from modified small-pox, was seized with alarming hæmorrhage, when the catamenia returned three days after the eruption. I have seen a case in a young lady suffering from modified small-pox. The fever was severe. She was menstruating when seized. Next day she was attacked suddenly with the most acute pelvic and abdominal pain. Peritonitis and tumefaction followed, and she was for some days in a critical state. I have little doubt that in this case the cause of the peritonitis was blood-effusion into the peritoneum. The case is of interest in this respect. Had the symptoms which attended the effusion in this case come on in the course of typhoid fever they would almost certainly have been taken to indicate perforation of the intestine. Is it not possible that such an error has been made?

Bernutz relates a case of hæmatocele from acute jaundice in a pregnant woman. When we reflect upon the extreme hæmorrhagic tendency which marks this dire disease, we cannot be surprised that hæmorrhage should take this form.

In the menstrual cases it is clear that fresh effusions into the peritoneum take place at successive menstrual epochs, producing temporary exacerbations of the local symptoms. In these cases it is probable that the subsequent effusions do not always take place into the cyst formed around the primary hæmatocele, but outside it, so as to cause fresh peritonitis. Hence those several collections of blood, divided more or less by fibrinous septa, which are sometimes found where there has been the opportunity of making a post-mortem examination. In the case related as attended with Mr. Cass the menstrual exacerbations were clearly observed. (See p. 610.)

A remarkable example of menstrual hæmatocele is that which results from *effusion of blood from the stump of an ovarian cystic tumour.* This event has been discussed in the chapter on Ovariotomy.

Dr. Playfair relates (*Lancet,* 1865) a very interesting case, in which a *pelvic abscess* appeared to be the cause of hæmatocele. Following on pelvic cellulitis there was a large discharge of pus by vagina. Three days later there was a sudden escape of a great quantity of dark-coloured blood, the coagulum of which filled one-third of an ordinary-sized chamber vessel. She eventually recovered. He conjectures that blood-vessels opened into the sac of the abscess.

There are observations to show that the blood may flow from *a varix of the broad ligament.* The vessels belonging to the ovary may become varicose, and under pressure of unusual distension they may burst. Richet and Ollivier d'Angers adduce evidence in point. Bernutz points out that in cases of hæmatocele from varix the accident comes on, not at a menstrual epoch, but after fatigue, which causes distension of the varix. It is certain that varix of the pampiniform plexus, and of the plexuses about the vagina and vulva, may result from pregnancy and complicate varices of the veins of the legs; and there are several examples known of a varix of a leg in a pregnant woman bursting, the accident proving rapidly fatal. I have myself known such a case. Richet especially describes hæmatocele as taking its source in rupture of varices of the ovarian or sub-ovarian veins. In these cases the loss of blood has been so rapid and profuse that no time has been allowed for it to become encysted. These, then, will swell the cataclysmic order of cases; and by their clinical history link hæmatoceles of ovarian origin with those proceeding from rupture of extra-uterine gestation-sacs. We may then conclude that hæmatocele from varix is possible; but observation shows that it is rare.

Dr. Tuckwell records a case related to him by Seyfert in which the blood came from the *rupture of a tubal vein.* A maid-servant, aged eighteen, while carrying a large vessel of water on her back, upset it and received the whole of its contents over her back and shoulders. She fell down suddenly and died rapidly. The occurrence took place at the time of the catamenia. The autopsy disclosed an immense mass of blood in the sac of the peritoneum. One of the veins of the left tube was found to be ruptured, and a small opening in the layer of peritoneum that covered the tube had allowed the blood to escape into the abdominal cavity.

One source of blood-tumour has been put forward on great authority as common. Virchow affirms that the *blood exudes from the delicate new-formed vessels of inflamed peritoneum;* that is, in fact, that there has been antecedent peritonitis. Tardieu relates two cases in which he concluded that fatal hæmorrhage came from the peritoneal surface. Bernutz, however, does not admit that these cases prove the existence of a hæmorrhagic pelvic peritonitis. Schröder goes so far as to affirm that a tumour caused by a collection of blood, which can be felt in the vagina, can only arise where a cavity is pre-formed for it; that is, when Douglas's sac is first closed above by a partial adhesive peritonitis.

I cannot help agreeing with Ferber, who objects that this pre-formed cavity is a pure hypothesis. But one cannot dispute a proposition made by a pathologist so rich in experience and sagacity as Virchow without misgiving. If, however, I might venture to interpret my own observations, I should be compelled to conclude that the peritonitic source must be extremely rare; and that the general opinion, which declares the peritonitis to be secondary, not primary, is correct.

Dr. L. Aitkin reports a case (*Edinb. Med. Journal*, 1870) in which a hæmatocele seemed to be caused by *the use of a laminaria tent.*

The influence of coitus has been specially treated by French authors. Thus Voisin says that of ten cases in which the commencement was traced to a menstrual period, in seven coitus had taken place, either during menstruation or shortly after, and pain began during the sexual act. Aran relates a marked case of the kind. In one instance observed by myself, I have little doubt this cause was an essential factor. In the other three cases of Voisin, cold, fatigue, or violence during menstruation seems to have determined the attack.

Group VII.—I have seen cases in which there was reason to believe that hæmorrhage was caused by *injury to the abdomen.* In these cases of direct violence it is not easy to determine the source of the blood effused unless a post-mortem examination be made. Should the patient be pregnant at the time, the commotion will be likely to determine hæmorrhage from the uterus or ovaries. Of course, the nature and extent of pelvic and abdominal lesions inflicted by violence are infinitely various. When a student at St. George's Hospital, I saw a case under Dr. Wilson of rapid death that ensued from the *bursting of an aneurism of the superior mesenteric artery.* The blood poured out was in great quantity; it was diffused all over the intestines. There was no attempt at cystic segregation.

The Symptoms and Diagnosis.—The great variety of causes and sources of blood-effusions into the peritoneum which we have passed in review, renders it manifest that we cannot lay down any concise general summary of symptoms. Perusal of the cases narrated in this chapter, and comparison of the features characteristic of the several groups into which I have arranged them, will convey the best idea of the significance of the symptoms. The cases I have pointed out may be broadly divided into two great classes:—1. Those in which an overwhelming shock attends a sudden and profuse loss of blood. This is the *cataclysmic* class. These cases generally coincide with the *non-encysted* class, the great majority of which end fatally. 2. Those in which the shock is less pronounced, in which the effusion is less profuse and less rapid, in which general and local signs of inflammation supervene. These form the *encysted* class, a large proportion of which end in recovery.

The history of the first, or cataclysmic class, is almost wholly comprised in that of rupture of the uterus, of extra-uterine gestation, and of ovarian disease. I will not dwell upon it here.

The history of the second, or encysted class, presents features admitting of being defined with great precision. It must not, however, be lost sight of that effusion resulting from menstrual regurgitation, although usually falling within this second class, may be cataclysmic.

In the *encysted cases*, the history may commonly be told in three chapters. 1st. There is shock and pain referred to the pelvis and lower abdomen, and anæmia. 2nd. There are signs of reaction, of fever, and pain indicating peritonitis, and usually attended by evidence of mechanical obstruction, as of the bladder. 3rd. There are the signs attending the disposal of the blood-mass and the inflammatory deposits.

1. A woman within the reproductive period of life, during a menstrual period, usually profuse, after being exposed to cold, fatigue, or sexual excess, is seized suddenly with pain in the pelvis. This is attended by shock, inducing more or less collapse, according to the suddenness and profuseness of the loss, and the susceptibility of the patient. The surface becomes cold, the face pale, the pulse falls; perhaps there is syncope: there is usually vomiting. If the loss be extensive, the signs of hæmorrhage, of anæmia, are added. But it must be remembered that these initial symptoms are not constant. Some cases begin insidiously, no striking event marks the beginning.

2. In the second stage, the signs of reaction appear. The pulse rises, the skin becomes warmer. There is felt a sense of warmth or burning, with distension of the lower abdomen. The pain persists. Frequently retention of urine occurs, and constipation follows. Menorrhagia commonly goes on. The rectum shows signs of irritation, a dysenteric condition is observed, marked by tenesmus and muco-sanguineous discharge. But this is not constant.

Examination of the abdomen usually reveals more or less enlargement and tenderness. The enlargement is in the form of a rounded swelling rising out of the pelvis towards the umbilicus, and stretching towards either ilium. In several cases the tumour has risen quite as high as the umbilicus. Examination by the vagina reveals conditions closely resembling those characteristic of retroversion of the gravid womb at the third or fourth month. The finger cannot proceed towards the hollow of the sacrum because a rounded tumour occupying that space pushes the posterior wall of the vagina forwards, altering the direction of this canal; following this, the finger is directed upwards and forwards, behind and above the symphysis pubis; and usually closely compressed against the symphysis just behind it, or a little below its level, the os uteri is felt. In cases where the cervix is soft, and the os large, this may be flattened out into a narrow transverse chink. The finger may be able to penetrate by pressure in front of the vaginal-portion, and also on either side; but the tumefaction is almost continuous with the posterior margin of the os uteri, seeming to form one with the uterus, and thus closely simulating the physical signs of retroversion. In the early stage, the tumour feels soft and fluctuating, but it soon becomes more tense, less resilient, and may eventually become quite solid. The solidity depends partly upon coagulation of the blood-mass, but more especially upon the formation of plastic effusions, the product of the peritonitis excited to segregate it.

Before removing the finger from the vagina, examination should be completed by catheter and sound. The use of the catheter may be indicated by retention of urine. Retention of urine, however, is not constant. It is especially wanting in those cases where the blood-tumour is more lateral—that is, in a broad ligament. When the bladder is emptied, the way is cleared for further precise observation. The os uteri is felt of a characteristic form. It is flattened transversely by the jamming it undergoes against the symphysis pubis. The finger resting upon the os uteri or in front of it, is opposed by the fingers of the other hand applied to the abdomen, just above the symphysis. Between them the body of the uterus may usually be traced, since the fundus is driven forward so as to project above the pubic symphysis (see Figs. 108, 109). This is made quite clear by the use of the sound. Passing this instrument into the uterus, it is found to penetrate upwards and forwards for the normal length of two and a-half inches, or usually more, the point being carried directly over the symphysis. And now abdominal palpation is repeated with more advantage. The uterus supported on the sound, is felt by its fundus; pressure by the fingers upon this portion imparts a movement which is plainly felt by the hand which holds the sound. Thus no doubt remains as to the position of the uterus. We know for certain that the softer, semi-fluctuating, or even, it may be, solid mass behind the cervix, is not the body of the uterus. Its rapid appearance under symptoms of shock, the quickly succeeding signs of local pressure and distress, tell us with great certainty that it is not a fibroid tumour, or an ovary, or an inflammatory effusion; and the knowledge derived from pathological studies tells us that only blood-effusion can produce a tumour in this situation, ushered in by the circumstances, and attended by the local conditions described. Examination by the rectum carries the diagnosis to still further precision, and usually the swelling is more marked, and comes lower down on the left side. The finger is immediately met by the rounded, more or less yielding swelling; by this, the finger is directed backwards along the sacral hollow; and it is rare that it succeeds in getting above the tumour, or even beyond its equator; the sensation imparted by the tumour differs from that of the retroverted uterus by being less solid. In the slighter cases of menstrual hæmatocele, when the amount of blood poured out is moderate, Douglas's pouch may be well filled, it will displace the uterus forwards and downwards; but there may be no tumefaction felt above the pelvic brim. But in some cases, the swelling, if not early, still in the progress of the case, rises to various points above the level of the symphysis, even as high as the umbilicus. In these cases, it may be possible, with or without the help of the sound *in utero*, to make out the round hard fundus of the uterus distinct from the larger tumefaction of the encysted hæmatocele. This is illustrated in Fig. 109.

The enlargement of the tumour is not so often effected by continuous gradation, as by sudden starts. At every menstrual epoch, there may be a fresh increment, due to renewed hæmorrhage. This event is marked by reproduction of the symptoms described in the first series, by exacerbation of distress.

3. As the case proceeds, the general and local signs undergo some modification. Pain usually persists, although it may be moderated. In cases tending to spontaneous cure, irritative fever subsides; the pulse may fall to 100, or less; the temperature to 100° Fahrenheit, or less. Usually some degree of tenesmus continues. More or less metrorrhagia is common. As the tumour lessens in bulk, under the absorption of its fluid elements, the uterus retreats a little towards the middle of the pelvis, relieving the bladder. Still the uterus is immoveable; and behind it there is still the tumour.

Dolbeau (*Medical Times and Gazette,* 1873) thus accurately describes the course of the affection:

"The different phases through which the encysted sanguineous tumour passes are revealed by signs, which must be searched for with the greatest attention. The induration and progressive diminution indicate that recovery is taking place. On the other hand, when seven or eight days after the accident you can certify that the tumour has become soft and fluctuating, you may be quite sure that the tumour is retrograding, and will empty itself externally. When, in addition to the softness which persists, fever adds itself to this symptom at the end of the day, with a real elevation of temperature, shivering, night sweats, and a great dislike to all kinds of food, you can be sure that the hæmatocele is going to suppurate; and this is a most important point to know beforehand, often indicating surgical intervention, to obviate septicæmia.

"Generally the tumour diminishes in size as it becomes harder, and as it approaches recovery. But in some cases, after improving for three or four days, a relapse takes place; the tumour, which seemed to be getting gradually less, suddenly increases in size, and at the same time grave general phenomena are observed. After this interruption, the symptoms rapidly ameliorate. . . . Now, in most cases, the menses influence this retrocession in a curious manner. Women suffering from this complaint are quite regular, the menstruation being scarcely deranged. In all cases, from the moment the catamenial flux commences, a most sensible diminution takes place in the size of the tumour."

The tumour may disappear by absorption, by perforation through the roof of the vagina, by perforation into the rectum. These issues are the normal methods of spontaneous cure. But the blood-mass may undergo a process of suppurative or decomposing liquefaction, setting up septicæmia and irritative fever. Hæmatoceles undergoing this or other change, distended by fresh effusions, under violence or without, may burst their cyst, and throw out the contents into the general cavity of the peritoneum. This issue is rare, but cases have been recorded. It is of course attended by fresh signs of abdominal injury and shock, and is likely to be quickly fatal. Dr. West records a case. Tuckwell relates the following on the authority of Seyfert:—A woman, in whom retro-uterine hæmatocele had been diagnosed, was frightened by a patient in the next bed being seized with convulsions. She sprang out of bed, and at the same moment felt a violent pain in the abdomen, which was followed by rigor and collapse. Three days after this she died. The general cavity of the peritoneum was found filled with bloody fluid, the blood having escaped from a sac situated behind the uterus, which sac had burst. The sac was formed by adhesions between the rectum on the one hand, and the uterus, right tube, and ovary on the other. It contained a quantity of blood, part fluid, part in clots, in a state of decomposition. The right ovary, of the size of a hen's egg, and filled with clotted blood, was easily recognized, and was found to have burst and discharged its contents into the cavity of the cyst.

Dr. Matthews Duncan relates a case (*Edinburgh Medical Journal*, 1864) of extra-uterine gestation, in which signs of rupture occurred at two and a-half months of gestation, followed by formation of hæmatocele. A month later, signs of fresh rupture appeared, and death followed in thirty-six hours. Autopsy revealed a tumour the size of a very large orange, between the sacrum and uterus, which contained a fœtus of less than two months' development, and clotted blood. A rupture of considerable extent had taken place in the anterior wall of the cyst.

Dr. Breslau, of Munich, relates (*Mon. für. Geburtsk.*, 1857) a case diagnosed as rupture of a hæmatocele, followed by recovery. The hæmatocele, which had been made out before, quite disappeared after signs of rupture.

The specimen described from St. Bartholomew's Museum also may be referred to as illustrating the termination by internal rupture of the blood-tumour.

In some cases, the intra-peritoneal perforation seems to be dealt with like the original effusion, by a fresh conservative peritonitis, which surrounds the new effusion of blood. Accordingly, in some cases, Dr. Madge's is an example, the blood-sac seems divided into two by a septum.

Two cases have been recorded, one being that of Dr. Madge, and another by Bernutz, in which phlegmasia dolens of one leg was developed in the course of the affection.

The proportion of cases which disappear by absorption is hard to estimate. It can scarcely be doubted that in some cases assumed to have terminated in this way, an opening was really effected into the vagina or rectum, very small, perhaps, but large enough to permit of slow evacuation of the hæmatic cyst. The process may be so gradual, that the moderate rectal or vaginal blood-discharge is not suspected to come from the cyst. In other cases the discharge by rectum or vagina is manifest enough. At a variable time, ranging from two weeks to two months, or more, blood escapes in one solid mass, or in small coagula mixed with fluid portions over several days.

Dr. Willoughby Wade conjectured that in some cases the blood-tumour liquefying discharged itself by the Fallopian tubes and uterus. But distinct evidence of this is wanting. As we have seen, a sanguineous discharge from the uterus and vagina is common; but it may be the expression of the general congestion or turgidity of the uterus. It is not evident that it comes from the cyst in the way Dr. Wade suggests.

In some cases the symptoms are essentially the same, but the general and local distress is less intense. The pain is slight, the fever moderate, the effusion is seldom large enough to be felt above the pubes. A few days, or at most a few weeks, suffice for recovery, the tumour disappearing almost as quickly as it came.

All the best observers recognize this order of cases, and hold them to be not infrequent. Of the truth of this I am firmly convinced. There seems no valid reason to doubt that small as well as large quantities of blood may be effused into Douglas's pouch; and there is ample evidence to prove that small quantities of blood may give rise to only slight irritation. If, as Tuckwell says, the objection be urged that as they do not terminate fatally, and are not large enough to necessitate puncture, the presence of blood as the cause of the tumour is merely conjectural, it may be answered that their close resemblance to the more pronounced cases, the nature of which is unmistakeable; the position of the tumour; and the rapidity with which it is absorbed, are sufficient to justify the diagnosis. Those who reject all evidence except that furnished by dissection, or by puncturing the tumour, shut themselves out from the possibility of instruction by clinical observation and reasoning.

In the milder order of cases, and in those which end by discharging through the rectum or vagina, the sac itself formed by peritonitic effusions has to be absorbed. This is effected more or less rapidly and completely.

In that order of cases in which the blood-mass undergoes disintegration, the symptoms of irritative fever supervene. The aspect becomes sallow, earthy. The temperature and pulse rise; rigors, vomiting, sweats appear; and, unless a vent be found for the imprisoned matter which is poisoning the system, the patient will be in great danger of sinking. There is commonly a complication with unhealthy peritonitis. The abdomen becomes more tense, tympanitic, and painful.

The *diagnosis* flows from the appreciation of the symptoms described. It may be affirmed with confidence that nothing else but a hæmatocele will produce them in their aggregate or cumulative character. The conditions most likely to lead to error are:—

1. *Retroversion of the gravid womb.*—This is the error I have known most frequently made. The distinction is made out by the physical exploration described above; by the history of pregnancy when there is retroversion; and by the absence of the fundus uteri from the pelvic brim or from the abdomen above the symphysis.

2. *Fibroid tumour.*—The presence of the body of the uterus in its normal place, or at any rate its being made out separately from the tumour under investigation, distinguishes fibroid from hæmatocele. The history of the two cases is essentially different. The fibroid is of slow growth; the hæmatocele of rapid or sudden growth.

3. *A small ovarian or dermoid cyst* locked in the hollow of the sacrum behind the uterus. By the unaided physical exploration, it is sometimes difficult to bring out decisive differential signs. A small ovarian tumour is fluctuating, elastic, occupies exactly the position of a hæmatocele, displaces the

uterus forwards in a similar manner, causes retention of urine, and carries the vaginal canal forwards, compressing it. But there is a difference in the feel of the tumour manifest to the practised touch; the history is different; the symptoms have usually come on gradually. The sudden shock of hæmatocele, the attendant peritonitis are wanting.

4. *A retro-uterine gestation-cyst.*

5. *Perimetric inflammation.*—The invasion of this affection is sometimes very similar to that of hæmatocele; indeed, it may be concluded that in some cases of presumed perimetric inflammation there is hæmatocele as well. The characters of perimetric inflammations have been described in the preceding chapter. It is enough here to repeat that the seat and nature of the tumefactions felt in the vagina and rectum differ from those of hæmatocele. They are rarely so purely retro-uterine; they are commonly lateral, often unilateral; they fix the uterine neck lower in the pelvis, and generally near the centre, or deviate it to one side; they are more knobby, irregular in shape; they are hard, brawny. But in one case Nélaton found the walls of a hæmatocele hard, like cartilage; and Madge describes the same condition. Retention of urine is more exceptional, and in the issue not blood, but pus is voided.

5. *Abscess in the neighbourhood of the uterus.*—This may be distinguished by the following differential signs:—Abscess is rarely so distinctly retro-uterine as hæmatocele. In all the cases I have seen which gave rise to doubt there was some degree of laterality. It is not so frequently connected with menstrual accidents; there is no coincident metrorrhagia. It does not attain suddenly its greatest intensity. The tumour is not formed from the commencement. The skin does not suddenly become anæmic. The mass, hard at first, becomes later soft and fluctuating, the contrary being usually the case in hæmatocele. The constitutional symptoms follow an inverse order from those of hæmatocele. But I have known pelvic abscess cause retention of urine.

The diagnosis may in some doubtful cases be assisted by the exploratory needle, or Dieulafoy's aspirator-trocar. The finest puncture may set up inflammation; and if the blood have coagulated, the negative result might betray the inexperienced explorer into the error that the tumour was not a hæmatocele. In the case of a hæmatocele, the blood drawn commonly resembles that taken from the uterus in cases of retained menses. It is treacly and dark-coloured. Should pus escape, the diagnosis of abscess is tolerably certain.

I am tempted to add Dolbeau's picture of the diagnosis:

"The diagnosis," says Dolbeau, "is sometimes very easy, at others very difficult. Great importance must be attached to the more or less advanced stage of the malady. If the case is seen at the commencement, you must bear in mind that hæmatocele is not the only uterine malady whose onset is sudden. The lypothymic symptoms, the pain and distension of abdomen, occur in both pelvic peritonitis and in intense ovarian congestions. Ovarian congestion and hæmatocele are never accompanied by fever. Pelvic peritonitis, on the contrary, is a malady essentially febrile. (But it is to be borne in mind that pelvic peritonitis and its attendant fever not seldom form an ulterior stage of hæmatocele.)

"*Position of tumour.*—In hæmatocele it gives rise to a projection just above the pubes, and sometimes almost reaches the umbilicus. The tumour in pelvic peritonitis never extends beyond the level of the symphysis, or if it does, it extends slowly; whereas, in hæmatocele, the tumour suddenly attains its maximum, and afterwards diminishes rather than increases.

"The excessive pallor of the face, so important a symptom in hæmatocele, is never seen in pelvic peritonitis.

"The *direction of the cervix forwards belongs exclusively to hæmatocele.*"

The *treatment* now admits of being indicated with some authority. Disposing, first, of the cataclysmic cases, it may be stated that the treatment merges in that of rupture of the uterus, of rupture of an extra-uterine gestation-sac, and of other great abdominal lesions. We must seek to rally from collapse by rest, by opium, and the sparing use of stimulants.

In the milder class of cases of true encysted hæmatocele, as in all the other cases, *rest* is the first and most imperative prescription. If we suspect that hæmorrhage is proceeding, we may apply cold to the abdomen. When signs of peritonitis are coming on, salines and opiates are of eminent service. As topical applications, leeches to the abdomen are often of use; then hot cataplasms or fomentations. Whenever there is retention of urine, the indication to use the catheter is obvious. It should be done at stated intervals—say every eight hours. If there is tenesmus or dysentery an opiate suppository should be administered. Purgatives, as breaking the law of rest, should be sedulously avoided. The bowels will probably act by-and-by, as in other cases of obstruction, under the use of opium; and an enema may be given after a few days, when the fæcal accumulation is marked.

The great contention has been as to the expediency of puncturing the tumour. Experience has gradually led to definite rules upon this point. So long as the local distress is not urgent, so long as the tumour remains hard, so long as there is no sign of septicæmia or irritative fever, so long is it wise to follow the expectant method, observing strict rest, and abstaining from all local interference. But when the tumour softens, when it enlarges immoderately, when the pulse and temperature rising indicate septicæmia, then it is time to consider the resort to puncture. This step being resolved upon, we have to weigh the method of performing the operation. The most convenient spot to select is the most bulging part behind the cervix uteri in the roof of the vagina. We must use a medium-sized trocar or a bistoury. But the best instrument is the long tube carrying a knife designed by me, which can be fitted to the aspirator. The instrument should be plunged in the direction of the axis of the pelvic brim, parallel with the posterior wall of the uterus. This line can be accurately defined by first passing the sound into the uterus. (See Fig. 111.) We thus get a landmark. If the instrument be directed obliquely backwards, it is apt to perforate the rectum first, and to enter

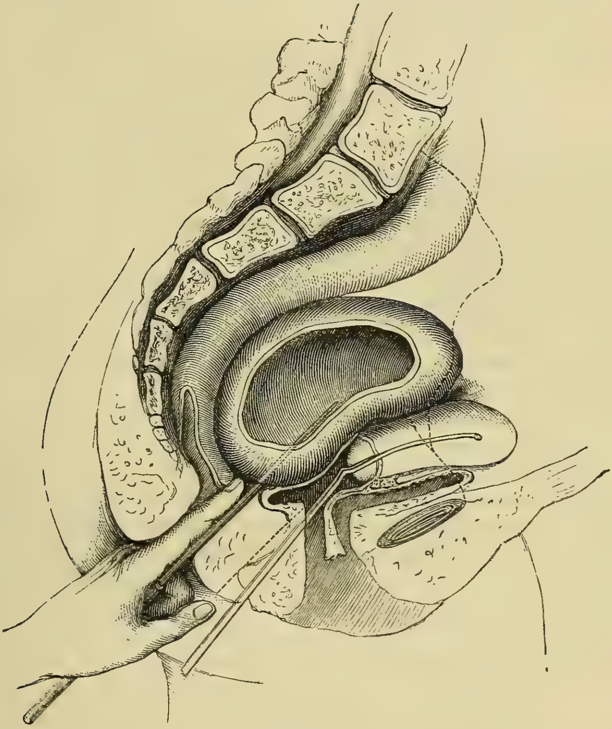

Fig. 111.

This figure is intended to show the relative position of the uterus and rectum and intervening cyst. The sound in utero having settled the position of the uterus, the trocar is thrust as nearly *parallel* as possible to the posterior wall of the uterus. The dotted line behind the sound shows how the perineum is held back by the finger during the use of the instrument. The direction of the os uteri, looking downwards and *backwards*, should be compared with that of the os uteri, the figure of retroflexion in which the os is tilted a little *forwards*. (R. B.)

the hæmatocele obliquely, affording only an imperfect escape. It is well to leave the canula *in sitû* to serve as a drain, or to pass in a coil-tube through the tube-canula. If the blood be in great part coagulated, we may scoop out what can be easily reached with the handle of a spoon; but generally it is wiser not to meddle too much. In some cases it may be more convenient to puncture by the rectum, as shown in Fig. 111. An excellent way of opening the cyst is by the galvanic knife or Paquelin's cautery-knife.

In cases where decomposition arises, the sac should be washed out twice a day with Condy's fluid, or weak carbolic acid.

Out of fifty-three cases of recovery tabulated by Tuckwell, thirty were treated without any operation. The remaining twenty were punctured. But it is at least doubtful whether in some of these latter the puncture was not superfluous, whether, indeed, it were not a source of danger.

One source of such danger is the admission of air into the sac, and the consequent decomposition of its contents. Aran records a case of this kind in which puncture was made by an exploratory trocar, a fistulous opening remained, and death ensued from putrid infection.

Here, as in all other pelvic and abdominal inflammations, it should be a standing rule to *avoid repeated examinations.* Manipulation must disturb parts which above all things require repose; it can hardly fail to irritate and to aggravate inflammation; it may burst the blood cyst, and lead to a fatal renewal of hæmorrhage and peritonitis.

CHAPTER XXII.

PLACEMENTS OF THE UTERUS, GENERAL PROPOSITIONS; DEFINITION; VARIETIES OF: PROLAPSUS DESCRIBED; HYPERTROPHY OF THE VAGINAL-PORTION; OBLIQUE OR LATERAL DISPLACEMENTS; ELEVATION; DEPRESSION; ELONGATION BY STRETCHING AND PRESSURE; DISLOCATIONS OF UTERUS BY EXTERNAL PRESSURE; VERSIONS AND FLEXIONS; ANTEVERSION; ANTEFLEXION; RETROVERSION; RETROFLEXION.

FEW subjects in medicine have exerted keener controversy than that of displacements of the uterus. Some dispute the reality of these displacements; others dispute their frequency or their importance. The first order of disputants, who simply deny what they have failed to recognize, chiefly consists of those who do not avail themselves of the necessary means to recognize the physical condition of the pelvic organs. To deny the existence of displacements of the uterus without physical examination is as unreasonable as it would be to deny displacement of the heart or of a joint without physical examination. And there is something more than unreasonable in the pretension of those who, thus refusing to examine for themselves, repudiate the experience and authority of others who speak with knowledge.

All who are in the habit of examining the pelvic organs when they show signs of distress recognize the clinical fact that displacements of the uterus are not only real but frequent.

But amongst those who admit this clinical fact, there prevails a diversity of opinion as to the primary and essential, or the secondary importance of these displacements. I hope to evolve satisfactory conclusions upon this question in the progress of this chapter.

We may usefully start with the following propositions:

1. The uterus is naturally a mobile organ, possessing within the limits of health a considerable range and variety of motion. (These natural movements are described at p. 24.)

2. These natural limits are liable to be overstepped under the sudden or repeated or continuous application of undue force

acting upon a uterus increased in bulk or weight, or imperfectly sustained by failure of its natural supports.

3. The uterus is no exception to the general law that displacement beyond its physiological limits entails difficulty in the performance of its functions.

4. Nor does the uterus offer an exception to the pathological law that displacement, which implies encroachment upon the seat of adjacent organs and pressure upon them, will cause distress in the organs immediately encroached upon.

5. Nor does the uterus offer an exception to the correlative law that distress in the performance of an organ, or a group of organs, will react upon the nervous, vascular, and nutritive systems, and thus entail remote symptoms and general disturbance of the organism.

All these propositions are incontestably proved by anatomical, physiological, and clinical observations.

6. Another proposition may be added: Although displacements are often initial or primary, disease ensuing as a consequence, when disease assails the uterus, displacement or deformity more or less marked is sure to be induced, thus aggravating the original disease, and adding the morbid complications peculiar to displacement.

7. Admitting the foregoing propositions, it follows, as a therapeutical corollary, that one essential factor in the successful treatment of all uterine diseases consists in correcting displacement or deformity.

Definition.—The uterus may be said to be displaced whenever it is removed from its usual position by some more or less persisting cause. Of course allowance must be made for the normal mobility of the organ. Movement within certain limits, if followed by return to the normal statical position, is not regarded as displacement.

Varieties.—The *displacements of the uterus* are as follows:

Upwards or elevation.
Downwards or prolapsus.
To either side or lateral deviation.
Forwards.
Backwards.

In all the above displacements the uterus may for a time preserve its normal form and size; its axis may remain unchanged; its shape may be unaffected.

In displacement with reference to the axis of the pelvis, the uterus may be altered in its inclination: that is, its fundus may be inclined forwards, constituting anteversion; backwards, constituting retroversion; to either side, constituting right or left lateriversion. These displacements are estimated chiefly by the deviation of the body of the uterus from its central position, the cervix remaining more or less fixed by its axis of suspension to the base of the bladder.

Displacements may be associated with change of form. Thus, the uterus may be bent, its axis undergoing deviation. It may be bent forwards, constituting anteflexion; backwards, constituting retroflexion; to either side, constituting right or left lateriflexion. The uterus also may undergo torsion or twisting on its axis. (See Figs. 23, 24, 25, 26, p. 39.)

PROLAPSUS OR DESCENT OF THE UTERUS.

It will be convenient to begin with the description of prolapsus. This is, if not the most common of all the displacements, at any rate that which most frequently comes under treatment.

In the great majority of instances the history is a continuous one, beginning with labour, and marked successively by uterine engorgement, sub-involution, inflammation, prolapsus, retroversion, and hypertrophy.

The most rational and profitable course then must be to follow the historical order; to study first the immediate consequences of labour, and then to trace out the subsequent events to their full accomplishment. The first chapter of this history has been already traced.

The leading fact then in the history of prolapsus of the uterus is imperfect involution after labour. If this great fact be kept steadily in mind, and the lessons in practice which it dictates be carried out, many cases of prolapsus will be prevented altogether, and many more will be arrested in their early and most curable stages.

Prolapsus uteri of course strictly means a falling of the womb. Instead of swinging at its proper level, it descends lower into the pelvis, and may even make its way through the vulva. Hence there are different degrees of descent. The minor degrees in which the womb only drops in the vagina are usually distinguished as *prolapsus;* whilst the extreme degrees in which the womb passes forth through the vulva bear the name of *procidentia.* Etymologically viewed, these terms have an arbitrary significance assigned to them; but it is convenient to retain them in the sense which custom has associated with them.

Prolapsus and procidentia may be more accurately defined as follows. If we regard the cavity of the uterus as a continuation of the walls of the vagina, the whole forming one tube, there will be, at the commencement of prolapsus, three duplicatures:

1. A central portion, the uterus itself, dropping down into the roof of the vagina, is invaginated.

2. Then there are the two folds or reflections of the vagina, one of which, representing the part in which the uterus is inserted, is carried down inverted by the uterus; the other is the part of the vagina which retains its normal position, and receives the inverted portion containing the uterus. So long as this stage of depression, of partial inversion of the vagina by the squatting of the uterus continues, there is prolapsus.

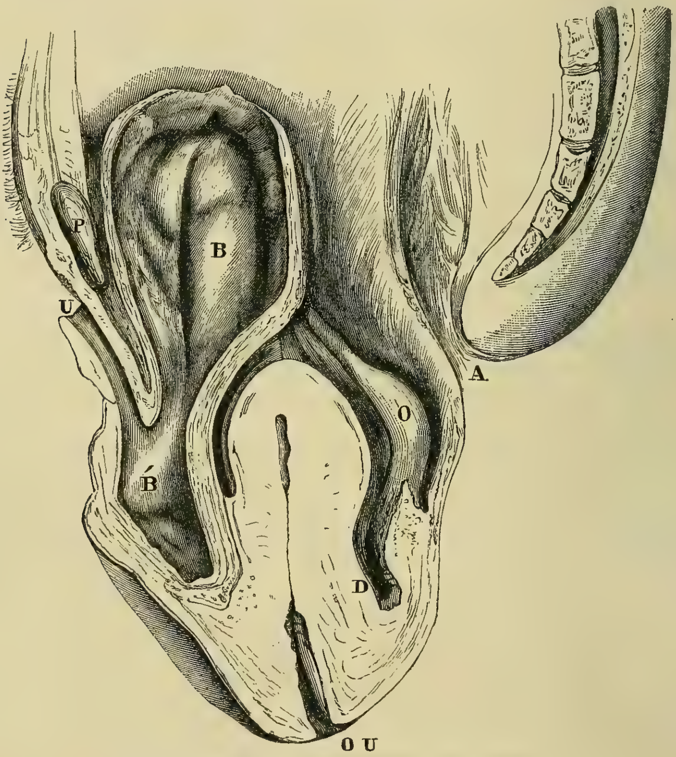

Fig. 112.—Half size, from St. George's Museum.

COMPLETE PROCIDENTIA UTERI (R. B.).

P. Symphysis pubis. B. Bladder. U. Urethra drawn almost vertically downwards to open into B′, a sacculated diverticulum of bladder outside the vulva, and in front of the procident uterus. O U. Os uteri. D. Douglas's pouch, extended outside the vulva. O. The ovary dragged down. A. The anus.

3. Procidentia exists when the body of the uterus, continuing its invagination, has passed quite through the vulva. When this has taken place, there are only two duplicatures, viz., the uterus which has passed into the now nearly completely-

inverted vagina. As Cruveilhier, however, observed, some vestige of the second duplicature formed by the vagina is constantly met with in the furrow of greater or less depth, situated behind the procident mass; for though the inversion of the anterior wall of the vagina may be complete, that of the posterior wall is scarcely ever so. Hence the tumour, caused by prolapsus uteri, is always longer in the vertical direction in front than it is behind. The theory of prolapsus and procidentia uteri may be summed up as follows: Invagination or intussusception of the uterus is prolapsus; complete inversion of the vagina or hernia uteri is procidentia. (See Fig. 112.)

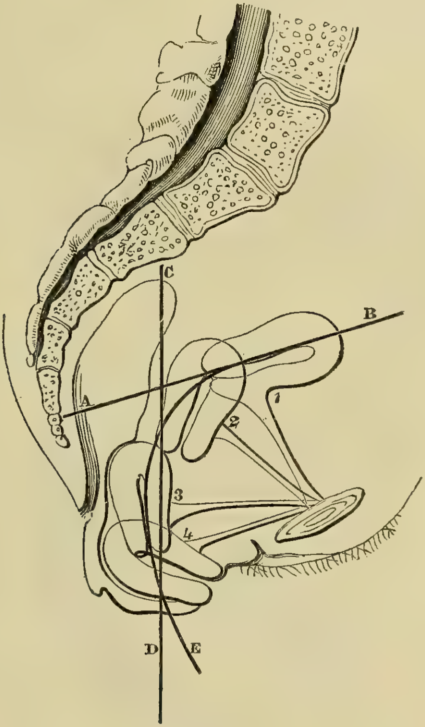

Fig. 113.

DIAGRAM ILLUSTRATING SUCCESSIVE STAGES OF PROLAPSUS OF UTERUS, AND THE ATTENDANT DEGREES OF RETROVERSION (R. B.).

A, B. Axis of brim of pelvis. C, D. Axis of outlet. B, E. Curve of Carus, or curvilinear axis of pelvis. 1, 2, 3. Stages of prolapsus. 4. Procidentia. The uterus tethered to the symphysis, revolves round it in descent.

In complete prolapsus the inverted vagina contains the uterus.

This is hypertrophied; its cavity is mostly enlarged, filled with mucus. Besides the uterus, the vaginal-sac commonly contains in front a portion of the bladder-base; behind, the anterior and lower part of the rectum. Looking into the pelvis from above we see between the bladder and the rectum a funnel-shaped cavity, in the depth of which lies the fundus of the uterus, dragging down after it the tubes and ovaries. (See Fig. 112.)

Such then is the typical form of prolapsus and of procidentia. The uterus, by its attachment in front to the base of the bladder, is tethered to the pubic bone by its lower third. The consequence is, that as the uterus descends towards the outlet, it must revolve round the pubic bone as a centre. The fundus then gradually rolls back, so that retroversion keeps pace with prolapsus, and when prolapsus has merged into procidentia, the fundus will be directed backwards towards the anus, whilst the os externum will be turned a little forwards. The exact position of the uterus at any point of this downward course may be accurately determined by the fingers and sound. The lower the uterus the more the point of the sound must be turned backwards to pass along its canal, and the more easily will the fingers in the rectum get above the fundus. When the procidentia is complete the whole uterus may be grasped between fingers and thumb, and its contour and size exactly made out, through its sac of inverted vagina. (See Fig. 112.)

The alteration in the course of the urethra sometimes makes it difficult to introduce a catheter. The catheter passes backwards and downwards into the substance of the tumour to a greater or less extent, according to the degree of procidentia. A good idea of this, as well as of the appearance of the tumour of procidentia, may be formed from Fig. 112, which I have drawn from a specimen in St. George's Museum.

The analogy between procidentia uteri and hernia has always attracted attention. The inverted vagina is the hernial sac; the uterus is the displaced intestine. Not uncommonly the sac contains a mass of small intestines besides. Owing to the peritoneum descending below the uterus and behind the upper fourth of the vagina before it is reflected upwards over the rectum, a deep pouch is formed, which undergoes great extension as the uterus and vagina are carried downwards. This pouch may receive an enormous mass of small intestine, so that the external swelling may be as big as a man's head. The intestine may be plainly felt by its gurgling. The anterior cul-de-sac of the peritoneum formed by the reflection from the bladder on to the anterior wall of the body of the uterus is too shallow to admit the small intestines into it.

The descent and inversion of the anterior wall of the vagina necessarily drags the base of the bladder and urethra with it, causing sacculation of the bladder and deviation of the urethra from its natural course. The degree of displacement, however, will depend somewhat upon whether the prolapsus have taken place gradually or quickly. If it have taken place quickly, the organs are carried down bodily together; but if the prolapsus be of slow production, the connective tissue uniting the vagina and bladder may yield and stretch a little, so that the urethra may not be so much distorted. But in the majority of cases the base of the bladder is so drawn down below the level of the meatus, that its contents cannot be perfectly voided. The constant straining to accomplish this causes distension and the gradual formation of a vesical pouch, which is partly outside the vulva. In this pouch there is a continual tendency to stagnation of urine. This leads to the deposit of lithates and phosphates, and the concretion of calculi in the diverticulum. But Cruveilhier met with a case in which the whole cavity of the undisplaced portion of the bladder was filled by a calculus. Golding Bird

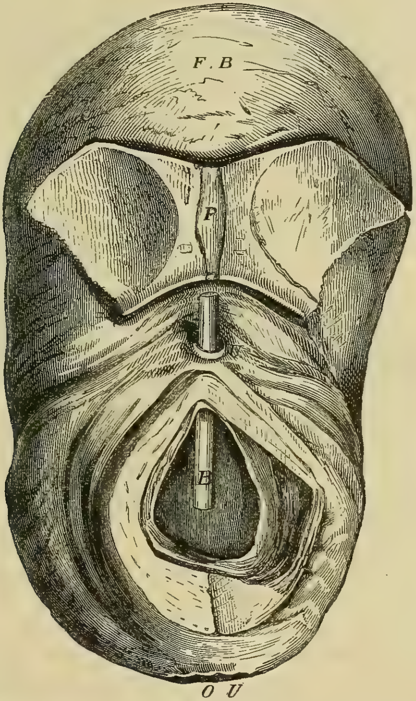

FIG. 114. Half-size, from specimen in St. George's Museum (R. B.).

PROLAPSUS UTERI, FRONT VIEW. UTERUS, BLADDER, AND PUBIC BONES REMOVED *en masse*.

P. Symphysis pubis. F, B. Fundus of enlarged bladder. B. Bladder opened, bougie passed into it from U, urethra. A pouch of bladder is drawn outside by the uterus. O, U. Os uteri.

pointed out how it led to formation of phosphates and ammoniacal urine. Dr. G. Roper related to me a case of prolapsus uteri et vesicæ, in which the bladder contained several calculi which could be rattled about by the hand. A similar case of complete procidentia with eversion of the vagina, and calculi in the pouch of the bladder was under my care at the London Hospital. There is also great liability to kidney degeneration as a retrograde consequence. According to Cruveilhier, the deviation of the meatus urinarius is less the effect of the displacement of the bladder than of the anterior wall of the vagina. The bladder generally is greatly enlarged. Wilks says (*Pathological Anatomy*, Ed. 1875), that when the bladder is drawn under the pubic arch, the ureters may be compressed against the arch. On two occasions compression of the ureters thus induced led to fatal pyelitis.

HYPERTROPHY OF THE VAGINAL-PORTION.

Although, according to my own observations, prolapsus and procidentia are distinct from hypertrophic elongation of the uterus, these conditions are so frequently associated in the same patient, and are otherwise so intimately related that it is most convenient to describe hypertrophy in this place.

The greater number of cases of considerable hypertrophic elongation of the cervix uteri occur in women who have had children, and after the age of forty-five or fifty, although we see its incipient stages at an earlier age. The hypertrophic elongation observed in women, married or single, who have never had children, is of a different form, and the cases are not very numerous. We may fitly describe this form first.

1. *The hypertrophic elongation of the cervix uteri of women who have never borne children.*—This form may be observed in comparatively young women. If, in the majority of cases, it first comes under observation in married women, this is commonly because before marriage the malformation, for such I believe it to be, lies quiescent. When the enlarged structure comes to be exposed to the contingencies of married life, which include possibly a considerable amount of direct violence, and certainly greater liability to congestion, distress arises. It entails all the inconveniences of a foreign body. It may be compared to a polypus in the vagina. It is usually conical in shape, the base starting from the fundus vaginæ, and tapering somewhat towards its lower end, at the point of which is seen the os uteri. This is usually a round opening, that will barely admit the uterine sound. The length of this hypertrophied vaginal-portion varies from an inch to two inches, or even more. The os uteri may come nearly down to the vulva, so that the vaginal

canal may be nearly filled with the protuberance. It not uncommonly happens as an aggravation of trouble that the vagina itself is short. Thus the male organ comes into violent contact with it, or after a time it distends the posterior wall of the vagina, and a pouch is formed in the roof behind the cervix uteri. That the excessive length is due to the elongation of the vaginal-portion is proved by the sound and by the touch, which show that the body of the uterus occupies its normal position in the pelvis, and is of normal length. Under the irritation to which it is constantly subjected it first becomes the seat of congestion, then of inflammation, perhaps of abrasion or ulceration. Friction against the vagina sets up inflamma-

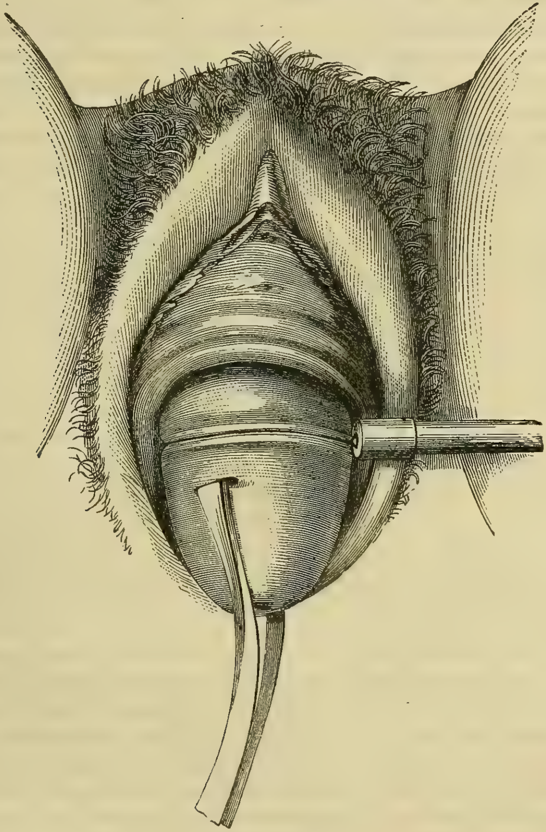

Fig. 115.

REPRESENTING ONE FORM OF HYPERTROPHY OF THE VAGINAL-PORTION, AND THE APPLICATION OF THE WIRE FOR AMPUTATION BY GALVANIC CAUTERY (R. B.).

tion in this canal, erosions of its mucous membrane occur; copious muco-purulent leucorrhœa and dysmenorrhœa and dyspareunia are sure to follow. The following case observed at the London Hospital is typical:—W., aged twenty-six, married, never pregnant; is harassed by menorrhagia and profuse leucorrhœa: has complained of prolapsus and procidentia for two years. From girlhood always had discharge and bearing-down. The vaginal-portion is smooth, round; the os externum projects beyond the labia majora; there is no eversion. The elongated vaginal-portion produces all the distress of a foreign body in the vagina; like a polypus it keeps up vaginal irritation, and induces expulsive efforts which increase the procidentia and hypertrophy. Relief ensued on amputation.

The only effectual *treatment* for these cases where the projection of the elongated vaginal-portion is at all considerable is, I believe, amputation. And the best way of amputating is by

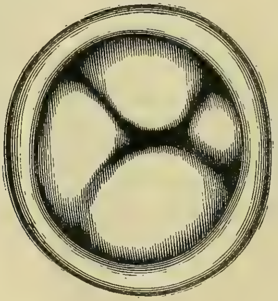

Fig. 116.—(Ad nat.)

APPEARANCE OF THE VAGINAL-PORTION AFTER COMPLETE CICATRIZATION FROM AMPUTATION BY THE GALVANIC CAUTERY (R. B.).

the galvanic cautery wire. A superfluous structure has to be removed, and amputation is not only the most complete method of accomplishing this, but also the quickest and least distressing.

The *operation* is performed in the following manner. (See Fig. 115.) The patient is placed either in the semi-prone position or in the lithotomy position, and brought under the influence of chloroform. A retractor is inserted into each side of the vulva, whilst a Sims' speculum pulls back the perineum, and exposes the vaginal-portion. This is then seized by a strong vulsellum, and drawn outwards, aided by pressure by an assistant's hand above the pubes. The battery being ready, the wire-loop is then adjusted round the vaginal-portion about half an inch below the line of reflection of the vagina. When the heat is turned on, the wire is gradually screwed up until it has severed the structure included. The severed surface presents a clean smooth aspect, showing concentric rings, the marks of the varying intensity of the cautery as it made its way. There is rarely much bleeding, and no special means are usually required to arrest it. Any protracted oozing from the surface of the stump or a pumping artery is soon stopped by touching with the porcelain-cone made dull-red by the galvanic current. Further security against bleeding is obtained by allowing full time for the heated wire to make its way through the part, and thus to secure a rather prolonged contact with the surface. A pledget of cotton-wool, soaked in carbolic acid oil, is the only dressing required. The section goes through the expanded portion of the spindle-shaped cavity of the cervix. This is not very liable to close during cicatrization, but to obviate this risk it is desirable to insert an intra-uterine pessary, to be worn for a month. The after-treatment consists in rest for a fortnight during the process of repair by granulation and cicatrization. The state of the new os uteri must be watched for some time afterwards, to be sure there is no undue contraction.

The result in my experience has been satisfactory. The inflammatory symptoms have subsided, the dysmenorrhœa and dyspareunia have been materially mitigated.

2. *Other forms of hypertrophy occurring after child-birth.* They may be said to grow out of the state of congestive hyperæmia and subacute inflammation of the cervix, which takes its departure from labour. The change consists in localized proliferation of connective tissue of slow production. The steps are sub-involution, hyperplasia, exudation of serum into connective tissue, proliferation. The course to be pursued to prevent this result, consisting in the cure of the primary stage, has been already described. If this course be not adopted the development of hypertrophy in some form, and to a greater or less degree, is pretty sure to follow. This secondary or acquired hypertrophy is slowly progressive; it may take many months or even years to attain its full extent. During all this time a degree of endometritis and inflammation of the vaginal-portion, with vaginal irritation, is kept up. Dysmenorrhœa frequently attends; more or less dyspareunia is common; there are attacks of metrorrhagia; and muco-purulent leucorrhœa is hardly ever absent. The glands of the cervical cavity become hypertrophied and secrete excessively. The increased bulk of the uterus and the relaxation of the vagina and other pelvic structures give rise to prolapsus, perhaps to retroversion. As in all cases where there is inflammation of the cervix the os externum remains patulous. Often there is a degree of eversion or of rolling-out of the lining membrane of the cervical canal; the lower margin of the palmæ plicatæ protrudes through the os, and comes into sight in the field of the speculum. (See Fig. 117.) The rough granular appearance thus exhibited, especially when the epithelium-investment is shed, as it often is, is due to the prominence of

the ridges of the arbor vitæ, and to the projection of the bared villi upon them, which in the natural state are levelled down somewhat by their epithelium-covering.

A somewhat similar appearance is produced when the hypertrophied lips are turned outwards in consequence of an exuberant growth of the ovula Nabothi, and acquire from the burst vesicles a red, angry, pitted and furrowed aspect.

What to the eye appears to be procidentia uteri, and was long believed to be procidentia, is, in the majority of cases, a hypertrophic elongation of the cervix, which extends downwards until the os externum and the inverted vagina protrude beyond the vulva. It was noticed by Morgagni, the forefather of so many modern discoverers. In a case he particularly described, he attributed the elongation to prolapsus and hypertrophy of the vagina. Levret, in 1773, also described it in a memoir entitled "*Sur un allongement considérable qui survient quelquefois au col de la matrice.*"

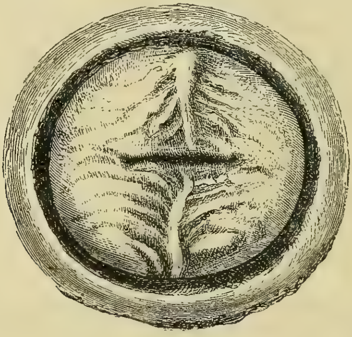

Fig. 117.

EVERSION OF THE MUCOUS MEMBRANE OF THE CERVIX UTERI (R. B.).

Cloquet correctly represents the condition in a plate,* and Cruveilhier has invariably observed it. This elongation chiefly occurs in the point of junction between the body and neck, and is accompanied by a striking contraction or narrowing of the part. In the second part of his work on pathological anatomy, Cruveilhier gives another plate, and additional observations, explanatory of the changes in the relation of parts, occasioned by the inversion of the vagina, or prolapsus of the uterus. It appears from his researches, that sometimes the elongation, and sometimes the depression of the uterus, aids in the greater degree. He met with cases in which the lengthening of the uterus was so considerable, that when the part was viewed within the pelvis it seemed as if it occupied its right situation. The co-existence of an inversion or doubling of the vagina, without any displacement of the womb, which has only undergone elongation, seemed to him to prove that in certain cases at least the displacement of the uterus has its beginning in the foregoing change of the vagina. The vagina becomes inverted on itself, like the finger of a glove, by a mechanism precisely like that which takes place in intestinal invaginations. This process has been explained above.

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* "Pathologie Chirurgicale," 1831.

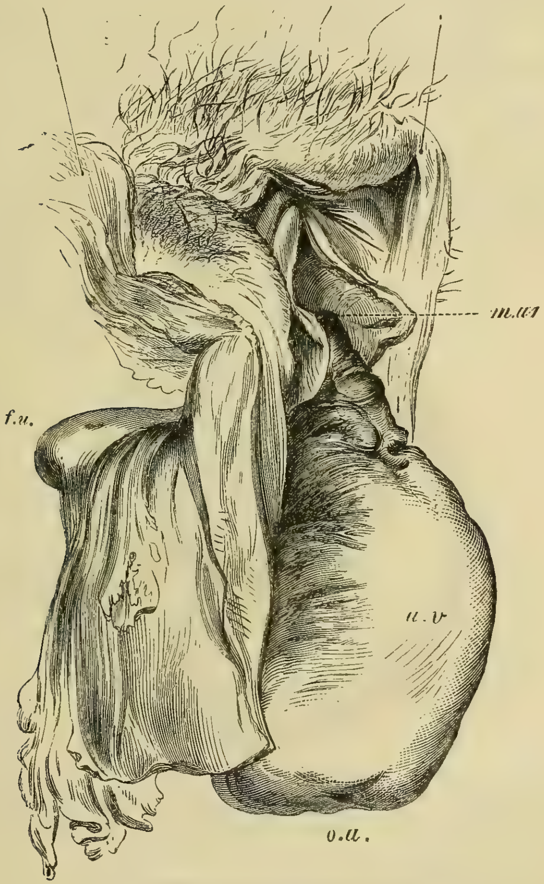

Fig. 118.—(London Hospital, nat. size).

PROLAPSUS OF UTERUS, WITH HYPERTROPHIC ELONGATION AND COMPLETE EVERSION OF VAGINA (R. B.).

m.ur. Meatus urinarius. *f.u.* Fundus uteri. *u.v.* Uterus covered by inverted vagina. *o.u.* Os uteri.

This is illustrated in Fig. 118, in which *f.u.* represents the fundus uteri *in sitû*, whilst the mass outside the vulva appears to be the procident uterus.

Another point observed by Cruveilhier is the greater or less deformity of the os tincæ. One of its lips, usually the posterior one, is very prominent, whilst the other is effaced. This is illustrated in Fig. 119, taken by me from a case under my care. In some instances the os is reduced to a very diminutive aperture. This is mostly the case in aged women, in whom atrophy probably preceded the prolapsus.

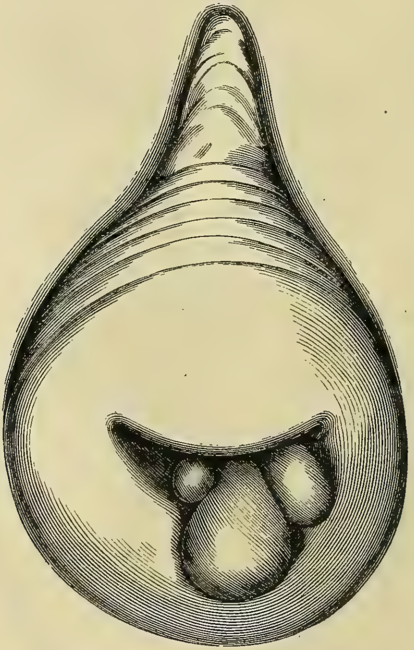

Fig. 119.—(Ad nat.)

HYPERTROPHY WITH PROCIDENTIA OF THE VAGINAL-PORTION. GREATER ENLARGEMENT OF THE POSTERIOR LIP. DEVELOPMENT OF "HYPERTROPHIC POLYPI" (R. B.).

Virchow, in 1847,* described this occurrence as a peculiar form of prolapse, under the name of *prolapsus uteri without descent of the fundus.*

The connexion between prolapsus and hypertrophic elongation of the cervical portion of the uterus demonstrated by the illustrious men whose names I have quoted, has been since (1859) described with great minuteness by Huguier. He was, however, far too absolute in his statement that prolapsus scarcely ever exists. He distinguishes four varieties. The *first* affects the body of the uterus only, and may cause prolapsus; the *second* invades the os tincæ only, or the sub vaginal-portion; the *third* invades nearly the whole of the neck, but especially the supra vaginal-portion. When the first and third co-exist, they make the *fourth* variety. To this I may add that hypertrophy of the body is very apt to cause retroversion, or retroflexion, or anteversion.

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* "Verhandlungen der Gesellschaft für Geburtskunde in Berlin," vol. ii. 1847.

Stolz, in a mémoir published * soon after Huguier's account was read to the Academy of Medicine, described it with a completeness of detail which leaves but little to be added.

The mode in which hypertrophic elongation of the cervix uteri occurs is in many cases, I believe, as follows: The first factor is arrested involution of the uterus. This entails endometritis, which in its turn leads to active hyperæmia and interstitial fibrin-effusions. Then a process of gradual continuous eversion, and growth of the cervix takes place thus: the external tissues of the cervical portion are fixed to the bladder and the fundus vaginæ, and being comparatively free from liability to congestion and inflammation, maintain their original condition as to length and *relative* position. The mucous membrane, on the other hand, which lines the cavity of the cervix is extremely vascular, is the primary seat of injury during labour, and of congestion and inflammation; it becomes swollen, with gorged vessels and serum and fibrin poured out into its submucous layers; hence there is increased villous growth, which can only find room by bulging out through the os tincæ.

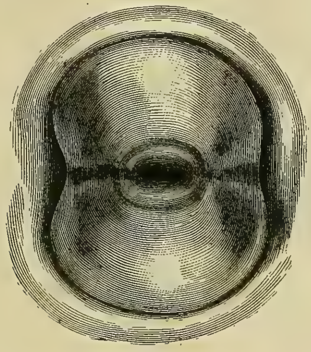

FIG. 120. (Ad nat.)

EARLY STAGE OF HYPERTROPHIC ELONGATION OF THE CERVIX UTERI; EVERSION OF THE LIPS EXAGGERATED BY THEIR BEING PARTED BY THE BIVALVE SPECULUM (R. B.).

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* "Journal hebdomadaire," Juin, 1859.

The peculiar traumatic condition of the vaginal-portion of the cervix caused by labour, combined with its subsequent special exposure to disturbance, is the reason why the cervix is more commonly arrested in its return to the normal condition than the body of the uterus. It has not only to undergo involution, but it has to repair damage. A chronic subacute inflammatory process sets in, which entails a perverted or exaggerated nutrition of the part. The watery part of the serum effused into it at the time of the original injury is absorbed; probably the solid constituents remain; fresh material, the result of the hyperæmic state compounded of congestion and inflammation, is added. Hyperplasia results, and is maintained by the irritation of an abraded surface, which, if the term ulceration be objected to, is at any rate distinguished by being bared of epithelium, by angry projecting villi easily bleeding.

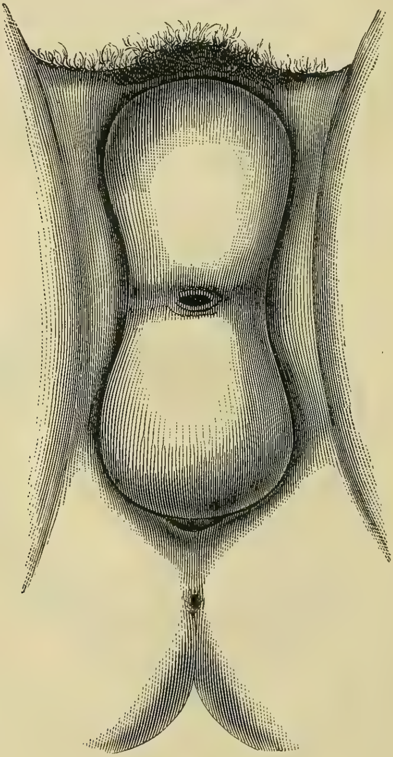

Fig. 121.—(Half-size.)

FORM OF ADVANCED HYPERTROPHIC ELONGATION OF THE CERVIX UTERI. THE TWO LIPS BEING EXTRUDED OUTSIDE THE VULVA, DIVERGE (R. B.).

This growth or extension of the cervix takes place from within outwards, and involves a process of eversion. That is, the hyperplasia is most active at the inner and lower part of the cervix. Growth being in excess at this part, eversion and elongation downwards necessarily follow. Then the increased bulk and weight of the organ favour descent which is imperfectly opposed by the attendant relaxed state of the vagina, and the other supports of the uterus. The presence of the lower part of the cervix near the vulva then excites reflex action, and the consequent straining efforts increase the

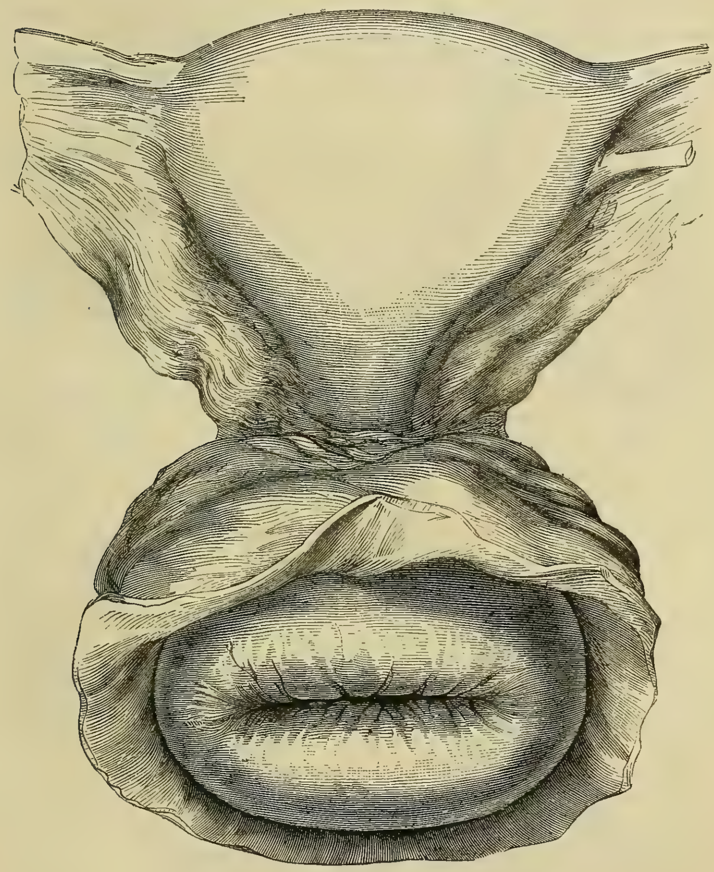

Fig. 122.—(King's College Museum, No. 9902. Nat. size.)

HYPERTROPHIC ELONGATION OF BOTH SUPRA AND INFRA VAGINAL-PORTIONS OF THE CERVIX UTERI, WITH ATROPHY FROM PRESSURE AND DRAGGING OF THE CERVIX, AND TUMEFACTION FROM STRANGULATION AT THE OS INTERNUM.

protrusion and the congestion. In this prolapse the two opposing forces of downward pressure upon the fundus uteri, aided by the increased weight of the cervix, and of pulling up upon the cervix by the fundus of the vagina and the attachments to the bladder, tend still further to promote eversion and downward growth.

In some cases the two lips elongate separately, so that when a bivalve speculum is introduced, and the blades are expanded, the two lips are made to diverge, exposing the cervical cavity between them. I have represented this condition, which I believe is frequent, in Figs. 120, 121. The os gapes like an alligator's mouth.

In the earlier stages, whilst the os is still in the vagina, the lips are flattened together by the walls of the vagina closing upon them. When opened by the speculum, endometritis is always seen. When the part has grown outside the vulva, the two lips freed from outward compression diverge and expose the interior of the cervix, just as the bivalve speculum caused the lips to diverge whilst the part was still intra-vaginal. This eversion is also favoured by the compression exerted by the vulva *above* the os.

In a memoir on "Hypertrophic Polypi"* I directed attention to a circumstance which marks the extreme activity of the growth of the lower segment of the vaginal-portion. This is the frequent association of small polypi at the os uteri with this hypertrophy. They are identical in structure with the hypertrophied cervix from which they spring. (See Fig. 119.)

The hypertrophic polypus of the cervix uteri, then, is simply an accidental outgrowth from the hypertrophic cervix. It differs in this respect from the fibroid or myoma of the body of the uterus. The latter begins from what may be called an aberrant nucleus in the muscular wall, and by its own growth causes hypertrophy of the uterus. But they are met with occasionally in association with fibroid of the body of the uterus.

These polypi sometimes form at a comparatively early period in the history of hypertrophy of the cervix. But they are more frequent in the advanced stages, and especially when the elongated cervix has protruded beyond the vulva.

I may here call attention to a noteworthy fact in the history of hypertrophic elongation of the cervix uteri. When this condition has reached its extreme limit, the cervix and uterus most frequently measure exactly 5 in.—that is, just double the normal length. This I have demonstrated so frequently to my classes by the sound that I have come to regard it as a law. The cases in which this length is much exceeded are rare.

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* "St Thomas's Hospital Reports," 1872.

There are other conditions which appear to cause hypertrophic elongation of the uterus. These I have observed under various conditions where the uterus was exposed to displacement and pressure, and to stretching. In some cases the first factor in the process was pregnancy. For example, in extra-uterine gestation, the uterus, feeling the stimulus, enlarges; and the enlargement is maintained perhaps for some months by the advancing development of the embryo; then if the

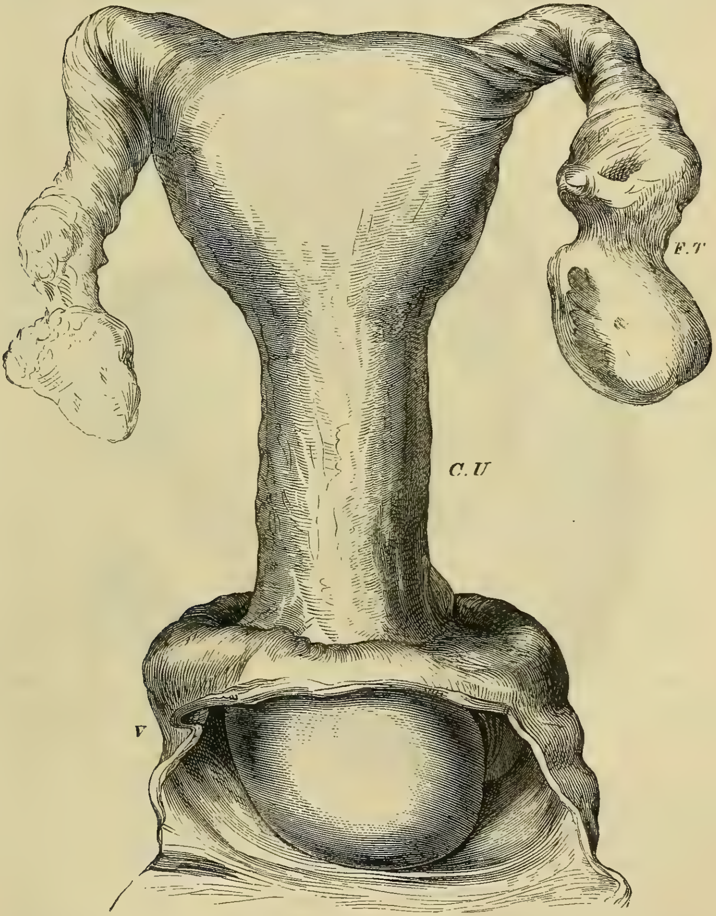

Fig. 123.—(Bartholomew's Museum, No. 32.30. Nat. size.)

GREAT HYPERTROPHIC ELONGATION OF THE SUPRA VAGINAL-PORTION OF THE CERVIX UTERI.

F.T. Fallopian tubes also diseased. V. Vagina containing spherical infra vaginal-portion of cervix uteri. C.U. Cervix uteri elongated.

uterus becomes displaced, as by being pushed forwards, or to one side, adhesions forming between it and the fœtal sac, elongation is pretty sure to occur. A similar effect is produced sometimes when involution of the uterus is prevented by pressure upon it from the masses of plastic matter resulting from perimetritis. Fibroid tumours not uncommonly cause hypertrophic elongation by a combined process of interstitial growth, stretching, and pressure. Ascitic fluid distending Douglas's pouch, and thus causing a kind of vaginal rectocele, may induce prolapsus.

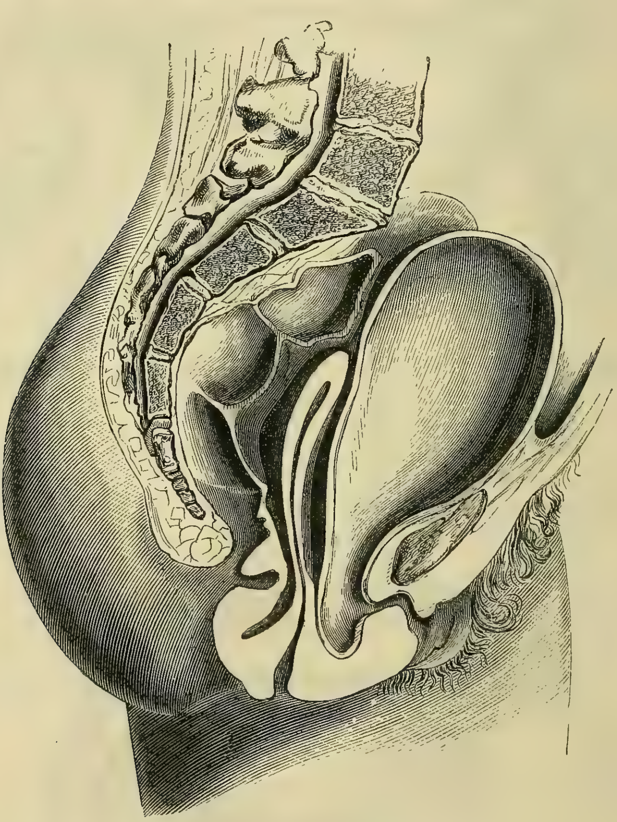

Fig. 124.—(From a specimen in St. Thomas's Museum. One-third size.)

HYPERTROPHIC ELONGATION OF THE UTERUS (R. B.).

Another form of hypertrophic elongation is seen in Fig. 123.

In this case the elongation chiefly affects the supra vaginal-portion of the cervix. Looking at the part below the reflection of the vagina, there is little appearance of hypertrophy. The long thinned cylindrical appearance of the cervix above the reflection of the vagina suggests the conjecture that the body of the uterus has been dragged upwards, whilst the cervix has been grasped by the surrounding structures.

The drawing (Fig. 124) accurately taken from a unique and valuable preparation in St. Thomas's Museum, illustrates many of the most interesting features in the history of hypertrophic elongation. An especial value of this preparation consists in the relative position of the parts being perfectly preserved. The changes undergone by the uterus are remarkable. The body of the uterus is decidedly elongated; it looks as if it had undergone stretching by pulling downwards. Its walls are a little thickened; its cavity is enlarged, especially in length. The demarcation between the canal of the cervix and that of the body is scarcely distinguishable. This may be due partly to senility. The cervix has undergone enormous elongation; and the part between the sacculation of the bladder and the rectum is remarkably thinned; it looks as if it had been drawn out, so that its length had been acquired by pulling, as when we stretch an elastic tube.

What is the cause of this elongation and thinning of the cervix? In the first place, it must be observed that these two conditions do not always coincide. If we examine a case of comparatively recent formation, before the subject has entered the climacteric, we shall not find the substance of the cervix thinned. It is a thick, firm cylinder throughout its length. On the other hand, if we examine a case of long standing in an old woman, we do find this thinning. The conclusion seems to be legitimate that the thinning is consecutive. It is a process of atrophy, partly senile, partly the result of continual stretching which bears upon the weakest point of the canal, and partly from constant pressure between the distended sac of the bladder and the loaded rectum. I believe the thinning is also caused by the constriction to which the elongated cervix is subjected where it is embraced by the vulva.

The entire length of the uterus in this specimen is about seven inches. The fundus and body are somewhat lower in the pelvis than natural; the body has undergone apparently very little elongation, the chief excess of longitudinal growth being spent upon the cervix. The two lips of the os uteri are much hypertrophied and somewhat everted. They form a mass covered by the everted vagina outside the vulva. That this is the result of downward growth, not of simple prolapsus or stretching, is seen in the condition of the bladder and of the ante-uterine and retro-uterine peritoneal pouches. The base of the bladder is carried down along with the down-growing anterior wall of the cervix uteri, forming a sacculated pouch below the level of the urethra and therefore below the symphysis pubis. The urethra is also distorted into a curve, of which the convexity looks upwards, the bladder-end of it being carried downwards along with the base, so that a catheter to pass would have to be directed, first a little upwards, then backwards and downwards. The body of the bladder is enormously enlarged; that is, its capacity is greatly increased, but its walls are not materially thickened, The change seems to be simply distension, probably the consequence, not of actual obstruction to the passage of urine, but to a habit of long voluntary retention acquired through the desire to avoid the irritation caused by the dribbling of urine over the protruding mucous membrane of the everted vagina. The fundus rose as high as the umbilicus, and considerably higher than the fundus of the uterus. The peritoneum, descending behind the abdominal wall, is reflected upwards over the bladder at a point about two inches above the symphysis pubis. It descends behind the bladder quite down to a point on a level with the sacculated pouch of the bladder; that is, below the level of the lower margin of the symphysis pubis. Rising over the fundus uteri, the membrane descends behind, forming a Douglas's pouch quite below the vulva. The only part not much disturbed is the rectum. Of course there is no apparent vagina, since the down-growing os and cervix uteri have carried the vagina before them, completely everting it and turning it into an investment of the protruded parts.

The specimen and the drawing exhibit very clearly the danger of amputating the hypertrophied cervix. It would not be possible to remove more than a portion of the os without opening the retro-uterine peritoneal pouch. It also explains the difficulty commonly encountered in keeping the protruded parts inside the pelvis by pessaries. The drawing exhibits the relations of the bladder, uterus, and rectum, exactly as they were found; that is, in apposition with each other. There were no folds of intestine descending between them in the anterior or posterior peritoneal pouches. In most cases probably when prolapse has begun, the vagina contracting upon it tends to cause elongation. This constricting influence is most conspicuously seen when a part protrudes beyond the vulva, where a ring of muscle embraces the protruded part.

In some cases the elongation is not uniform. It affects the two lips of the os unequally. The anterior lip may be almost alone affected. This is thought to be explained by its being directly within the influence of the traction made on it by the prolapsed bladder. This produces the singular appearance termed by Ricord the "col tapiroide." The inner surface of the lengthened lip has sometimes a channelled appearance, the continuation of the cervical canal.

I think this special elongation of one lip is to be explained as follows:—In several cases where the tongue-shaped elongation of the anterior lip was very marked, the posterior one remaining short, there was strong retroflexion of the uterus with enlargement of the body of the uterus. The consequence of this condition was that the vaginal-portion was subjected to protracted compression against the symphysis pubis. In some cases the compression was brought into evidence by retention of urine. Under this compression, the anterior lip becomes flattened and elongated. A similar change does not take place in the case of simple retroversion in which the vaginal-portion is tilted up above the symphysis. Nor does it commonly take place in ordinary cases of retroflexion in which the uterus, not greatly exceeding the normal bulk, finds ample room in the pelvis, and thus does not jam the vaginal-portion against the symphysis. When this elongation has become pronounced, it causes irritation of the vagina, and leucorrhœa. I have cured it by amputating the redundant portion and maintaining the uterus in its due relations. (See Fig. 125.)

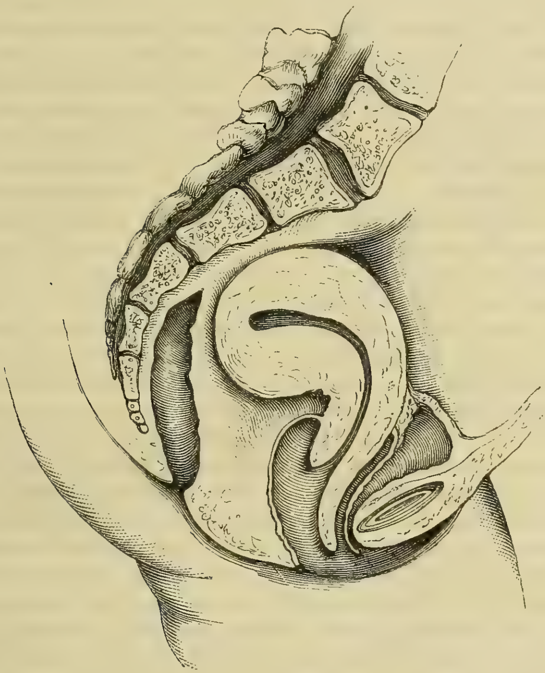

Fig. 125.

DIAGRAM SHOWING HOW HYPERTROPHIC ELONGATION OF THE ANTERIOR LIP OF THE OS UTERI IS CAUSED BY PRESSURE UNDER RETROFLEXION (R. B.).

The Etiology of Prolapsus, Procidentia, and Hypertrophic Elongation of the Uterus.

In further studying this subject, it is desirable to start with an enumeration of the different circumstances under which these conditions have been observed.

I have seen prolapsus uteri in virgins caused, 1, by attacks of epilepsy; 2, by violent coughing; 3, by the dragging of a polypus; 4, by succussion, as from a fall upon the nates, and from railway collisions. In the first, second, and fourth cases the prolapsus may be called acute. It is produced by sudden violence, tending to drive the uterus and other pelvic contents out through the vulva. It is liable to be attended by acute inflammation, and is commonly marked by excessive local pain. 5, by the pressure of an ovarian or other tumour upon the uterus; 6, by habitual over-exertion during menstruation, when the local conditions resemble those of parturition; 7, by straining at stool.

Roberton and Whitehead, of Manchester, were consulted respecting a girl, aged fifteen, who had just received a sudden fright. The entire uterus was beyond the vulva and external to an intact hymen. It was replaced, and no future inconvenience resulted. McClintock has seen three cases where the displacement resulted solely from the violent efforts required in defæcation to overcome an organic stricture of the rectum. I have seen prolapsus in a virgin produced I think in the following manner: habitual loading of the rectum by scybala below the level of the os uteri tilted the cervix forward, and consequently the fundus backwards. These efforts at defæcation throwing the expulsive force more upon the anterior wall of the uterus would produce retroversion and prolapsus.

But it is during the exercise of the child-bearing function that prolapsus is most common. To the accidental causes which produce it in virgins, are now added causes springing from sexual relations attended or not by pregnancy. The dominant feature of these causes is increase of bulk arising from physiological or morbid congestion, from inflammation, from imperfect involution after labour; this is primarily or secondarily attended by relaxation of the structures which support the uterus, including the ligaments, the vagina, and the connective tissue of the pelvis. The vagina alone, if in a state of healthy contractility, will maintain the uterus *in sitû;* but when its contractility is impaired, the uterus squats down, or sinks in it, producing a minor degree of vaginal depression or inversion. The close attachment of the anterior wall of the cervix uteri to the bladder, making the point of union the most fixed point or centre of movement of the uterus, renders it impossible for the cervix to fall without dragging the base of the bladder down with it.

In discussing the etiology of prolapsus great importance is usually laid upon the study of the mechanism by which the uterus is suspended in its place. The attachments of the uterus have been described. (See Chapter I.) We have seen that it is slung or suspended in the folds of the broad ligaments to the sides of the pelvis, and steadied to a certain extent by the round ligaments in front, and the utero-sacral ligaments behind; that it is in a manner balanced upon the vagina, which, in its healthy state, forms an elastic muscular column of considerable strength; that it is attached by its anterior wall to the base of the bladder; and that it is further supported by what may be called the padding of the pelvis, constituted by the connective tissue between the peritoneal folds, the vessels, nerves, and other organs. No doubt the proper preservation of the position of the uterus is due to the integrity of all these structures. The power of the vagina as a support to the uterus, and as an agent in restoring it to its place, is capable of demonstration. When the speculum is introduced, the widening of the vagina produced by it, shortens the canal and brings the uterus down; as the speculum is being withdrawn, the vagina is seen to contract strongly behind it, and the consequent restoration of the organ to the normal columnar state carries the uterus up again. And we may at any time by strong astringents restore the vagina, partly at least, to its original condition.

West further insists that the curved direction of the vagina, and the angle at which the uterus is inserted into it, afford a further obstacle to prolapsus; whilst at either extremity the vagina is strengthened by its connexion through the medium of the pelvic fascia with the bladder and rectum above, and by the sphincter which surrounds it below, as well as by the other muscles of the pelvic floor and by the perineal fascia between the two layers of which those muscles lie.

The value of experiments on the dead body designed to show how the uterus maintained its position, notwithstanding that the vagina was cut away, as by Hohl and others, or after division of the ligaments, seems to me to be exaggerated. It is clearly, indeed, proved that the uterus cannot be dragged out of the vulva, unless considerable force, amounting, says Le Gendre, to from thirty to one hundred pounds be used. But it is also certain that the broad ligaments must at the same time undergo great stretching or be severed. The conditions of the living body are widely different. In the dead body there is no turgescence from vascular fulness, elasticity of tissue, muscular contractility, constant movements from respiration and the varying states of the bladder and rectum; indeed, all the conditions as we meet them in practice are wanting. Deductions drawn from experiments upon the dead body can only be applied with great caution and reserve. For solution of the main questions we must rely upon clinical observations. In the great majority of cases prolapsus is accomplished by small forces acting continuously or with brief intermissions over long periods of time.

The fact that prolapsus does not occur in healthy structures, except under the influence of direct force, points to the necessary conclusion that the sustaining tissues of the uterus lose their power of resisting a down-bearing force through changes wrought in them by disease. With the knowledge of these two factors: force, acting upon tissues weakened by disease, the explanation of the mechanism of prolapsus is not far to seek. The downward force is always acting. It is exerted at every expiratory effort, and is exaggerated by coughing, or by straining at stool; by every exertion, in short, which fixes the chest. If the resistance be diminished, the pelvic organs will be carried down, the ligaments will undergo gradual stretching, and the vagina, wanting tone and contractility, squats down under the pressure, the uterus sinking into it. Then the force of gravity is added, and is always at work when the body is in the upright posture.

The vagina, then, is a passive, not an active, factor in the production of prolapsus. It yields and permits prolapsus, because its contractility and power of resistance are weakened. It does not cause prolapsus, although when prolapsus has begun, it may aid the subsequent steps of the descent. This discussion is not without practical interest, because the knowledge of the mechanism by which prolapsus is brought about must govern the principle of treatment. In studying the conditions of treatment, the first thing that strikes us is, that we cannot act directly upon the broad and other ligaments. We cannot, in nautical phrase, brace up or tauten these. We must act from below. Hence we are reduced to two principal sets of mechanical expedients. The first set comprises the mechanical supports, as pessaries, which help to lift up the uterus and anterior wall of the vagina. The second set comprises the various methods of strengthening the vagina so as to restore its power of supporting the uterus.

The efficacy of the vagina, especially of the muscular posterior wall which includes the perineum, in sustaining the uterus will be clear to any one who will remember the opposition it offers to the descent of the child's head in labour. Nor can any one who has felt the thick firm inclined plane in which muscle so largely enters, formed by the perineum and the posterior vaginal wall, doubt its power to support the anterior wall of the vagina and the uterus. We may, in fact, feel the uterus resting upon it. Thus, when this inferior support is lost, as when the perineum is lacerated, the tendency to prolapsus is greatly increased; and we find the use of an external perineal pad, which acts as a substitute for the perineum, of signal service in supporting the uterus. It must not, however, be concluded that prolapsus is a necessary consequence of laceration of the perineum. I have seen many cases in which the sphincter ani was torn through, and yet the uterus was held *in sitû* by its other natural supports.

We see that in virgins, *force alone* exerted upon healthy structures is enough to cause prolapsus. This force obviously comes from above. It is produced by the pressure of the intestines upon the uterus, bladder, and broad ligaments propagated from the diaphragm and abdominal walls.

Now, this force which acts alone in a certain number of cases, enters as an important factor into every case. It acts, of course, with special advantage after labour, when the bulk and weight of the uterus are increased, and when all the tissues are relaxed. After labour at term, and after abortion, the mobility of the uterus is enormously increased. Any one who has frequently been called upon to remove a retained placenta in abortion, will have satisfied himself upon this point. The uterus is, in the first place, at a lower level than usual; and in the next, the most moderate traction will draw it down to the vulva with a facility unknown at other times. This implies that the broad and other ligaments are elongated and more yielding, and that the vagina is relaxed.

For the above reasons I am of opinion that, in the majority of cases, prolapsus of the uterus is a primary affection. But there are facts which favour the view more prevalent in Germany, which is, that prolapsus is secondary upon prolapsus of the vagina. For example, if we examine a woman the subject of procidentia when the mass is within the vulva, and tell her to bear down, we see the anterior wall of the vagina appear first; that is, there is apparent vaginal cystocele preceding the appearance of the uterus. It is inferred that the vagina drags down the uterus. The vaginal cystocele is also, it is said, the first condition. I suspect there is a fallacy in some of these observations. If by the hand in the vagina we watch the course of events during an expulsive effort, we feel the uterus borne bodily down under the force of the superincumbent pressure. Of course the uterus and bladder, being intimately adherent, must descend together. The vagina can only be forced downwards through pressure exerted upon the uterus, or bladder, or both. It is possible, of course, that frequent pressure exerted by the distended bladder may push down the anterior wall of the vagina, which in its turn will drag down the uterus. But that such a process is not frequent, seems to be proved by the fact that one almost constant factor in prolapsus uteri is enlargement and increased weight of the uterus, which must necessarily destroy the balance between the forces that suspend the uterus and those that tend to drive it down. This correlation being destroyed, the uterus cannot but fall, and it is unnecessary to invoke an independent or superfluous force, such as the downward dragging of the vagina.

I have frequently made the observation with such care that I am sure of the fact, namely, that the earlier stages of hypertrophic elongation of the cervix are accomplished whilst there is no perceptible descent of the bladder, no bladder distress, and no prolapsus of the anterior vaginal wall. I have even seen cases of marked hypertrophy of the lips without perceptible prolapse. I have also seen the converse, that is, decided vaginal cystocele, the anterior vaginal wall rolling out under straining, without any hypertrophic elongation of the cervix. There is not, therefore, any necessary connexion between the two conditions, since each may exist without the other. I go further, and affirm that hypertrophy of the vaginal-portion may take place independently of prolapsus of the uterus.

Symptoms, Effects, and Course of Prolapsus.—When prolapsus is produced suddenly, the symptoms attending are generally complicated with the effects of the accident which caused the displacement. This may be called *acute prolapsus*. Thus, when produced by a fall or concussion, there may be other injury besides the prolapsus, and there is always more or less shock Then, the sudden succussion occasions violent stretching of the uterine supports. As these are all connected with the peritoneum, inflammation of this membrane is very likely to follow; there will be severe pain over the whole abdomen, especially acute in the pelvis, tenesmus, or bearing-down, perhaps uterine hæmorrhage, and severe febrile symptoms; and bladder and bowel distress.

Sometimes the parts quickly resume their normal position, especially if rest in the horizontal posture be duly observed. But this will not always be the case. The uterus may have been driven through the pelvis with such force as to break through the hymen; and the uterine ligaments, once stretched, do not quickly recover their pristine condition. Moreover, the general health may be so affected by the shock and local injury, that the recovery of tone of the muscles and other tissues will be retarded by impaired nutrition.

When prolapsus takes place slowly—*chronic prolapsus*—the symptoms are less urgent. As prolapsus is surely attended by antecedent or consequent engorgement, or other morbid state of tissue, the symptoms of course are a complication of effects depending upon the tissue-changes, and of mechanical effects due to the displacement. The first class of symptoms will be described in their appropriate place. The mechanical conditions are traced to dragging and to pressure. The uterus having lost the support of the vagina, and of what may be called the padding of the pelvis, drags upon the utero-sacral and broad ligaments, which are stretched and elongated. In the upright posture, especially, and under bodily exertion, the prolapsus is necessarily increased; the sense of dragging and bearing-down is then aggravated. At stool and during micturition, some additional difficulty being felt from the pressure of the uterus, greater straining is exerted to empty the bladder and rectum. The uterus itself being larger and pressing upon the lower part of the vagina and near the anus, excites reflex irritation, the response to which is seen in increased bearing-down or expulsive efforts. The uterus, in fact, acts now as a foreign body. Its presence in a situation not accustomed to receive it, is resented, and the effort at ejection increases the displacement, and constitutes a main difficulty in treatment. The dysuria and *dyschezia** increase in proportion as the patient continues in an upright posture, and as the uterus descends nearer to the vulva. Besides these reflex effects upon the motor nerves, the patient feels pain from the congested state of the uterus, from its pressure upon surrounding organs, from dragging upon the peritoneum. These pains are intra-pelvic, sacral, dorsal, and lumbar, partly from indirect pressure upon the pelvic nerves and sacral plexus, partly from irritation of the ganglionic nerves, and partly from the spinal exhaustion, resulting from continual irritation.

The congestion often leads to menorrhagia, or even to hæmorrhages in the intermenstrual periods; and leucorrhœa is hardly ever absent.

When the uterus in its descent comes to press upon the vulva, the muscles, the elastic tissue, and mucous membrane, and skin which surround and constitute the walls of this opening, undergo distension. Under continual pressure the opening enlarges, the perineum especially is thinned out, it dilates, is partially everted, and rounded. The contractility of the vulva is greatly impaired; the floor of the pelvis no longer gives adequate support to the structures above it. Prolapsus then easily passes into procidentia. The inverted vagina becomes virtually a hernial sac, which receives the uterus and often a mass of small intestines. Although the peritoneum is drawn down so low that Douglas's pouch is outside the vulva, the stretching of the ligaments having been very gradual and slow, a degree of accommodation and tolerance has been acquired, so that the pain of dragging may be even less than during the early stages of prolapsus. The uterus being now outside the range of the sphincters, the reflex expulsive efforts and pains may also be less troublesome. The subjective symptoms change in character. The local symptoms are different. Under great exertions in the upright posture, the dragging upon the peritoneum may be very severe.

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* Difficult defæcation, from δυσ- and χέζω.

Procidentia Uteri.—The swelling protruding between the thighs is at first of an oblong, nearly cylindrical form, and terminates below in a narrow extremity, in which a transverse opening, the os tincæ, may be discerned. At a later period it has a pyriform appearance. The vagina turned inside out, which forms the investment of the swelling, changes its character and appearance. From exposure to the air, the moist villous character of mucous membrane is lost; the surface becomes dry, in places shining. There is, as Virchow describes it, a histological transformation. The soft epithelium gives way to epidermis, the histological equivalent. Often there are patches of inflammation and ulceration. These patches get covered with a thin pellicle resembling cuticle. It is a kind of scab. If peeled off, the surface easily bleeds. Sometimes ulcerations occur where they are easily overlooked, namely, in the fold at the base of the prolapsus, especially at the posterior part. I have seen nodular irritable ulcerations here which disappeared under rest.

The patches are usually described as being the result of friction, of chafing against the thighs and dress, and of urinous irritation. I have certainly seen sores formed on the most depending part of the tumour where it was exposed to chafing on sitting down; and on either side where it came into contact with the thighs. The vaginal-portion is no longer conical; the cervical portion swells from stasis; and the vagina on the stretch pulls open the os, exposing the inside of the cervix.

The walls of the vagina get thickened partly from hypertrophy, partly from infiltration and retention of serum in the connective tissue. This is an effect of the dependent position; the vessels can with difficulty return the blood poured into them. The stretching smooths out the rugæ. The mass has often a dark-red or even a purple colour, but is often pale.

The friction of the mass against the clitoris is at times a source of distress.

Chronic inflammation of the uterus is a frequent concomitant. The uterus becomes painful to pressure. Its situation exposes it to violence, which may induce acute inflammation. This may also be induced by the use of improper pessaries, and the inflammation may extend to the surrounding tissues. Inflammation of Bartholini's glands is not uncommon.

The mass outside may be seized with *gangrene,* the result of strangulation at the vulva. After prolonged exertion in the upright posture, the parts get full of blood, the return being impeded by the attendant swelling of the labia vulvæ. I do not think this event is common. But we have seen a remarkable example in St. Thomas's Hospital. A very large part of the surface of the procident mass fell into sphacelus. The labia vulvæ were tumid, showing the dull-red of erysipelas or threatening gangrene. The patient sank in a few days. The autopsy was performed by Dr. Payne. The sphacelus had involved nearly the whole surface of the inverted vagina, and in some places perforation had almost been accomplished. The uterus had undergone no marked hypertrophic elongation. Nearly the whole of the organ had been contained in the inverted protruded vaginal sac. The bladder was greatly enlarged; there was retrograde dilatation of the ureters and of the pelves of both kidneys.

Another danger to be borne in mind is that of *rupture or laceration of the vagina.* Dr. Fehling relates (*Arch. für Gynäk.*, 1874) the case of a woman, aged 63, who had long suffered from procidentia, forming a mass as big as a child's head. After carrying a bucket of water up some steps, she found she was unable to return the mass as she had done before. Using some force, she felt as if something had given way, and intestines came through. Collapse set in. Dr. Fehling found a mass of small intestines as big as a man's head protruding, cold, without movement. He in vain endeavoured to return it. He punctured the intestines, and still failed. The woman died in eleven hours. This history suggests the necessity of using the utmost gentleness in attempting to return a procident uterus. The structures have undergone changes that impair their tenacity, making them more lacerable.

As a general fact, it may be stated that *the tendency of prolapsus is towards aggravation.* The cases of spontaneous cure are rare. The only qualification of this proposition applies to the minor degrees of prolapsus. Some cases have been cured by sloughing of the vaginal walls, and the consequent cicatricial contraction of the canal. Prolapsus may also be said to be removed when, cancer supervening, the spreading disease seizes the surrounding parts, and keeps the uterus fixed in the pelvis.

The changes induced in the organs concerned in procidentia are well described by Scanzoni. The vagina, uterus, and broad ligaments, bladder and rectum being removed from the pelvis, we are struck with the size of the uterus, and with the expansion, relaxation, and want of elasticity of the vagina. The vagina has lost its rugæ; its surface is usually smooth, often livid, and if the prolapsus has lasted long in an extreme degree, it is very dry, covered with a thick layer of pavement-epithelium which gives to the mucous membrane the aspect of epidermis. The vaginal-portion, commonly hypertrophied, often indurated, but sometimes very swollen and softened, is of bluish-red or slate-grey colour; around the orifice it is deprived of epithelium and covered with erosions and ulcerations. Often, after a long persistence of the disease, a true inversion of the cervix is produced; the orifice begins by being sensibly dilated; its borders form a circle an inch or more in diameter through which the cervix is inverted, so that the mucous membrane peculiar to the neck, covered by its vitreous secretion, is seen. A section of the uterus displays considerable hypertrophy with engorgement. The cavity is always much dilated, especially lengthwise, and the mucous membrane shows chronic catarrh.

There is also frequently follicular inflammation at the os uteri in the younger women. But in the more aged the follicles have commonly undergone atrophy after bursting.

Three conditions may exist in apparent procidentia uteri:—1. Hypertrophic elongation of the cervical portion of the uterus. This, of course, is attended by eversion of the vagina, the fundal portion of which is drawn down by the advancing os uteri. 2. The case may be one of eversion of the vagina, the pouch formed by which, projecting, somewhat in the form of a sausage, contains the uterus at the bottom perhaps of normal size, or, as in aged women, atrophied. 3. There is equally inversion of the vagina; the pouch outside the vulva containing the uterus retroflexed or doubled up.

The distinction between these three cases is easily demonstrable. 1. In the case of hypertrophic elongation, if we pinch the tumour upwards from the os uteri, we may trace the elongated cervix as a hard cord up into the pelvis as far as the finger and thumb will reach. If we then introduce the sound, we find this instrument will pass up along the uterine canal quite into the pelvis, until its point is arrested about on a level with the pelvic brim—that is, the sound will usually run a length of five inches. If we turn the point of the sound when thus arrested towards the anterior abdominal wall, we may generally feel the fundus of the uterus by pressing a hand in to meet it above the pubes. We also know when the point of the sound has reached the fundus uteri by the sense of resistance; and by gently continuing the pressure we produce a degree of re-inversion or re-position. We see the everted os uteri turn inwards, and the mass outside becomes diminished in length. It is needless to say that this demonstration must be conducted with great care, lest we injure or even perforate the uterus.

2. The second condition, that of pure procidentia uteri, may be recognized by the fingers. First, the fingers compressing the tumour can trace the included uterus by its hardness, and determine with precision its form, size, and position; the fingers get all round the uterus, grasping it completely, and thus demonstrating that it is wholly outside the vulva. Secondly, the sound again takes measure of the uterus, and proves that there

is no elongation; that it is two and a-half inches long, or barely a little more.

3. In the third condition, that of procidentia of the retroflexed uterus, the diagnosis is made out in a similar way.

Since I meet all these three conditions, I cannot accept any doctrine which absolutely excludes one of them as impossible. The real question to settle is the relative frequency of their occurrence. I believe the hypertrophic elongation is the most frequent, but I can give no numerical data.

The two conditions arise under different circumstances. Although both are observed in women in the decline of life, the hypertrophic elongation is more frequently found at an earlier period. It is an active process of growth. The cervix elongates in continuation of a process of inflammation and engorgement, aided no doubt by other conditions, taking their rise from pregnancy and labour. The procidentia uteri more commonly results from a process of which atrophy of the uterus and of the pelvic padding is the first step, and superincumbent pressure is the second. This is more frequently observed in women past the climacteric; it first appears at this period; it is not the climax of processes begun after child-birth. Indeed, it may occur in women who have never borne children. I have seen it in a girl aged seventeen, who had never borne a child. In these cases the uterus is sometimes so shrunken that it is scarcely bigger than a walnut, and there is commonly closure, complete or partial, of the os uteri. In one case I found atrophy of the uterus almost absolute.

S. Cooper has cited cases of complete procidentia of the gravid uterus. I have seen a case of the kind in the practice of the Royal Maternity Charity. In this condition it is obvious that to expel the child the uterus can derive no help from the diaphragm or abdominal muscles. If the whole mass can be easily returned within the pelvis, this will be the better course. If not, it will be wise to dilate the cervix uteri artificially by means of my water-dilators, and to deliver by forceps or turning, taking care that the uterus be well supported by the hands of an assistant during the delivery. When this is effected, the uterus must be returned, and a firm perineal bandage be applied to prevent it from falling through again. Occasionally procidentia of the gravid uterus is simulated by pregnancy with hypertrophic elongation of the cervix. When labour comes on, the child passes along the lengthened canal of the cervix, and is arrested at the os externum uteri, which lies outside the vulva. The os externum being thus enormously distended, has been taken for the uterus itself, the body of which is really in its normal position. I have seen several examples of this. In each case the practitioner attending assumed it to be complete procidentia. It may fairly be doubted whether some of the recorded cases of presumed procidentia of the gravid uterus were not in reality cases of hypertrophied cervix.

The uterus, in a state of prolapsus, is sometimes affected with scirrhus and cancer. A case of this description was met with by Ruysch; such a complication was seen in one instance by Cruveilhier. (*Anat. Pathol.* livr. xvi.) Its extirpation was completed by MM. Récamier and Marjolin, by means of a ligature, though the patient is stated to have died afterwards from some cause which had nothing to do with the operation. Instead of this method, which must inevitably be attended with great risk of tying a portion of the bladder, Cruveilhier recommends making an incision into the posterior parietes of the vagina, and thus getting into the great peritoneal *cul-de-sac* between the bladder and rectum, drawing the uterus outward, and separating its cellular connexions to the bladder. A woman, whose uterus was cancerous, and in a state of complete prolapsus, without any inversion, was attended by Langenbeck, who succeeded in removing the diseased organ with a knife, and the patient recovered. According to this author's description, after the vagina had been separated from the uterus, the latter organ was detached from the peritoneum without opening into the peritoneal cavity, a small portion of the fundus uteri being left, however, apparently quite sound. The bleeding was very profuse, and required the use of the needle and ligatures.

The Treatment of Procidentia and Hypertrophy of the Uterus.—The treatment best calculated to meet the early stages in the production of these conditions has been described in preceding chapters. It remains now to discuss the modes of dealing with the more advanced or confirmed cases. Keeping the uterus at its proper level is a very effectual factor in curing inflammation and hypertrophy of the cervix. This is due, I believe, to the relief which the vessels supplying the organ obtain when supported in their natural relations. When the cervix is sunk low in the pelvis the vessels are dragged down, become elongated, varicose, they form large loops, with a depending curve, liable to angulation by compression; the circulation through them is necessarily sluggish, and seeks relief by serous effusions into the tissues, thus increasing the hypertrophy, and impeding curative processes. A considerable degree of œdema is a frequent complication of the advanced degrees of prolapsus, with inversion of the vagina. To such an extent is this the case that occasionally the bulk of the protruding mass becomes so great that there is extreme difficulty in returning it into the pelvis. To facilitate this step it is necessary first to get rid of the œdema. This is done by applying strips of plaster around the mass, so as to compress and support the tissues. It is often useful to prick the swollen tissues with a lancet, to let the serum drain off. After two or three days, the patient keeping her bed, the mass will commonly be so far diminished as to enable it to return. If swelling be attended by inflammation of the surface of the mass, it will be proper first to subdue this by cooling astringent lotions; lead or tannin answer well; or it may even be desirable to apply leeches. A properly applied pessary acts partly by re-inverting the vagina and cervix, and partly by restoring the vessels to their natural relations, thus opposing two of the most prominent factors in the production of prolapsus.

Maintaining the uterus at its proper level further acts by taking off the strain upon the ligaments, and thus giving them the opportunity of recovering their tone. They are somewhat elastic, and if relieved of the drag upon them they slowly retract, and in time regain much—I believe rarely all—of their pristine value.

Sometimes the procidentia is irreducible. Inflammation may have been followed by adhesions which bind the uterus and appendages down. In one case pain was so much increased, and so obstinate a constipation came on, that it became absolutely necessary to let the uterus descend again. In any irreducible case we must be content with supporting the swelling, and preventing its increase by a suspensory bandage, and drawing off the urine by catheter, whenever requisite. Sometimes the displacement of the bladder causes an incontinence of urine.

The extreme pain which attends the attempt to return the procident mass into the pelvis is often due to some degree of inflammation having been set up in the peritoneum lining the pouch, into which the intestines descend, at the upper and back part of the womb, or of the peritoneal investment of the intestines themselves; and death may in these circumstances take place, with many symptoms of the same kind as attend upon fatal strangulated hernia, or ileus.

Another cause of the bulk of the tumour, and of the difficulty in replacing it, arises from the presence of the intestines in the sac, which seldom reside there long without inflammation of their peritoneal coat being set up; not of so acute a character as to produce formidable symptoms, but matting their different coils together, and tying them firmly to the interior of the sac.

Again, where a mass of intestine has been long protruded reduction is difficult, and retention *in sitû* perhaps impossible, owing to the loss of capacity of the abdomen to accommodate it. The abdomen has shrunk.

These considerations, then, suggest that reduction should be tried very gently, closely observing any resistance that may be presented to the return or retention of the parts within the pelvis.

The immediate effect of returning the procident uterus to its place is to shorten the elongated neck, if the case be one of hypertrophic elongation. The structure is elastic; it retracts like the ligaments when the strain is taken off. But much is not gained in this way; perhaps nothing in extreme senile cases, where there is thinning of the cervix. In these cases when the procident mass is returned, the cervix being too long for the space in the pelvis which has to receive it is doubled up. But the plan of reduction and supporting the mass inside the pelvis by mechanical means is not so irrational as it is by some thought to be. Certainly it is not a cure; it is a palliative proceeding. But this indication is often fairly fulfilled. I could exhibit a considerable number of hospital patients who by help of suitable pessaries are placed in comparative comfort, and are enabled to earn their livelihood by washing and other laborious occupations.

The keeping the uterus within the pelvis at its proper height is further an important condition preparatory to any of the various operations performed upon the vagina and cervix. By this means, aided by rest in the recumbent posture, the uterine supports regain strength; and this will be of essential service when the patient recovers from the operation. A troublesome consequence of prolapsus is the "spasm" or reflex irritation, caused by the presence of the uterus near the vulva. This distress is pretty sure to be removed by a pessary which will carry the uterus up to its proper level.

Whatever other treatment be adopted, it is a point of great importance to keep the bladder periodically relieved. For want of attention to this the pouch formed at the lower part of the bladder, by the dragging down of the cervix uteri, tends to get bigger, and becomes an aggravation of the uterine and vaginal displacement. To empty the bladder fully it is necessary that the protruding mass should be returned into the pelvis. Some women afflicted with procidentia have learned the trick of pressing the anterior part of the mass upwards by the hand during micturition, and thus of emptying the bladder more completely. The collection of phosphatic deposits, and the formation of calculi may thus be prevented.

Mode of Returning the Procident Mass.—The patient should lie in the semi-prone or knee-elbow posture. The tumour should be treated as a hernia; the part last emerging should be returned first. The base should be grasped by the two hands, and gentle pressure exerted at a part of its circumference at a time, whilst the mass is being pushed back in the direction of the axis of the pelvis.

When the parts have been reduced we have to consider how to keep them in position. The patient should be in bed, the bowels relieved, and an astringent lotion used twice a day, as a preparation for the use of a pessary. Under these precautions any inflammation or ulceration of the uterus or vagina soon heals, and the mucous membrane recovers its normal moisture. The vulva also regains some portion of its natural firmness, and becomes better able to retain a pessary.

It must not, however, be concluded that mechanical treatment is everything. It is always indeed useful, but sometimes it is not the most important part of the treatment. It is essential to consider the complications, as hypertrophy, inflammation, or engorgement. In many cases the prolapsus disappears when the uterus is restored to health.

In a considerable number of the slighter forms of prolapsus much benefit is obtained from the frequent use of astringent injections. And nothing more conclusively proves the value of the vagina in supporting the uterus than the action of astringents upon it. The corrugation and contraction of the canal which these induce is often found sufficient to keep the uterus in place so long as the effect upon the vagina lasts. An effectual and convenient way of applying astringents for this purpose is to wrap up a scruple of alum or sulphate of zinc in powder, in a piece of cotton wool, and to insert this in the vagina. This the patient can commonly do with her fingers; but where this is difficult it is easily accomplished by aid of the plug-speculum.

The Use of Pessaries.—It is one of the many controverted points in gynæcology whether the use of pessaries in prolapsus is or is not a scientific proceeding. If pessaries are found useful, it matters little whether they satisfy the conditions of science. That thousands of women do find comfort and benefit from their use is a fact too notorious to be disputed. Still it is asserted that their usefulness being only palliative and temporary, and science supplying modes of treatment which are curative, pessaries should be discarded. If the premises were true we could not reject the conclusion. But they are only partially true; and a wide field is still left for study and the application of various modes of treatment, according to the various forms of the malady.

The operations to which alone the claim to be scientific is arrogated, howsoever well devised, are not certain in their results; they are not free from the dangers which attend other similar operations; and they not seldom fail in their intent. No doubt these operations may be, and will be, improved, and become more certainly successful. But, in the meantime, it is not wise to discard instruments so useful as pessaries.

As prolapsus is a hernia, so a pessary is a truss. Mr. John Wood and other surgeons have devised and successfully executed admirable operations for the radical cure of inguinal hernia. These have not, however, supplanted trusses. So it is with prolapsus. Notwithstanding the ingenuity and success of several of the operations for its radical cure, pessaries are still found necessary.

Before applying pessaries it is necessary to ascertain the absence of adhesions binding down the uterus. This is done by careful manipulation, and by the use of the sound. On carrying the uterus gently upwards, obstruction, if existing, will be felt. Occasionally the part is returned, after a great deal of trouble: but owing to the long altered state of the parts, the reduction brings on worse symptoms than resulted from the procidentia.

Description of Pessaries.—The word pessary comes from *πέσσω*, to soften, and was originally used to signify a soluble medicinal substance, similar to a suppository. It is only by a corruption that it has come to be applied to the instruments designed to support the uterus. To these instruments it has been proposed to give the more appropriate name "hysterophores," from *ὑστέρα*, womb, and *φέρω*, I bear.

Pessaries, that is hysterophores, act on different principles. The object of most is to counteract prolapsus, or to keep the womb in proper form and place. Others are designed to stimulate development and function. Others to subdue inflammation and irritation and to overcome contraction of the vagina.

Those which have the first object in view act on one or more of the following principles:—

1. By mere distension of the vagina below the uterus they block up the outlet, and so keep the uterus from falling out. The balls and air-pessaries mostly act in this way.

2. Others act by utilizing the contractile power of the vagina. The stem-and-cup pessaries act in this way, combining something of the leverage power of the next class.

3. A third class act by leverage principally, thus utilizing the normal act of respiration and the contractile property of the vagina as well.

4. A fourth class act by directly supporting the uterus or its axis of suspension by a disc which bears up the uterus, and is itself supported by a wire-stem, which is in its turn supported outside either in front or behind.

5. A fifth class are intra-uterine. These may be subdivided into two orders.

   A. Those designed to straighten the uterus when flexed. These are of two kinds: those which are attached to extra-uterine supports, and those which are simple.

   B. Those designed to stimulate development and function, as the galvanic.

6. A sixth class are vaginal pessaries, designed to overcome irritability and inflammation, by keeping the walls apart and at rest—"vaginal-rests."

An attempt to give anything approaching to a complete account of the pessaries that have been contrived would be hopeless. Dr. A. K. Gardner gives drawings of 123 different forms; and he is far from exhaustive. Almost all fall within one or other of the classes indicated above. Most, especially of those of the first and fourth classes, may be discarded as vicious in principle and faulty in practice; and a judicious selection from the most approved specimens of the other classes will bring the really useful instruments down to a very small number.

The Choice of Pessaries, and the Mode of applying them.—In one class of cases, chiefly of simple prolapsus, we can avail ourselves of the contractile property of the vagina. In another class, we can derive no assistance from this source. We must apply all the support. These conditions govern the choice of pessaries.

The first class of cases includes those where there is prolapsus, not procidentia, where it is comparatively recent, and the patient is not past the climacteric. For many of these cases, especially if there is any inflammatory complication, and the patient's circumstances forbid her to rest, some modification of Hodge's pessary is the best. Since in the cases under consideration, it is assumed that the vagina preserves contractility, our study should be not to destroy or diminish this property, but to utilize it. Hence we must reject the whole array of box-wood balls, and huge thick rings, which depend for their efficacy upon mere bulk. A globe of moderate size will not do, because it will in all probability be soon expelled. To be retained, it must be large enough to cause some difficulty in getting it in through the vulva, it must then take a bearing upon the floor of the pelvis, resting upon the ischiatic tuberosities and sacro-sciatic ligaments. Thus placed in the way the uterus cannot escape. But the penalty is the destruction of the contractility of the vagina by constant distension, and often serious inflammation and ulceration of its walls. Offensive discharges of mucus, pus, and blood follow; and pain compels the patient to seek relief. Under these circumstances the removal of the pessary is sometimes a task of difficulty, particularly if the ball is of large diameter. When such a ball has been worn for some years, the vulva will be found so much contracted that it represents a ring, whose diameter is much less than that of the pessary. The vulva by age and abandonment of use may have, moreover, become extremely rigid. *It becomes of greater practical moment to know how to remove these pessaries than how to introduce them.*

The extraction of a ball-pessary under these circumstances resembles the delivery of a child whose head is impacted, with this difference, that the ball, although smaller, is absolutely unyielding. Sometimes the ball may be hooked out with the fingers by getting the last joint fairly above it and pressing it down upon the perineum. But this is often difficult; the ball rolls over and cannot be fixed. It must be seized with a forceps. A small midwifery-forceps will perhaps answer the purpose, but the extreme rigidity of the vulva may prevent the introduction of the blades, unless the margin be first incised. It is better to do this than to use violence. To grasp the ball, whatever forceps is used, the ends must be curved so as to get beyond the equator, otherwise they will not hold. In one very difficult case that came under my care at the London Hospital, I got a long and strong polypus-forceps curved at the ends so that it held well. The ball was nearly as large as the head of a seven months' child.

There are still to be found in the instrument-makers' shops huge rings or disks made of india-rubber or box-wood, or other material, which also act by bulk and by blocking up the pelvic outlet. The surgeon now and then becomes acquainted with them through the mishaps they occasion. Like the balls they set up vaginitis, ulceration, and cases are not rare in which even perforation has ensued, and the pessary has made its way wholly or in part into the bladder or rectum. The vaginal-portion also received into the ring has become swollen, inflamed, and incarcerated.

Lüders* relates a case of a lady who had a pessary of caoutchouc stuffed with hair, 3½ inches long, 2½ inches broad, and 1 inch thick. Peritonitis followed, and then hectic. A swelling was felt between the vagina and rectum; the pessary was not found. A year later another physician found the same swelling; and a transverse scar in the posterior vaginal wall. Two years later a fistulous opening appeared in the anterior wall of the rectum, which enlarged, and the pessary was removed. The pessary had passed into Douglas's pouch. The patient recovered.

Where resort is deemed necessary to the principle of filling the pelvis below the uterus, the best of all means is the air-pessary contrived by Gariel. This consists of a globe of india-rubber prepared so as to resist moisture, and which can be distended after it is introduced into the vagina. The patient can apply and remove it herself; and removal is easy by letting the pessary collapse.

Some more modern forms of pessary are not free from objection. Zwanck's instrument is, in my opinion, one of these. It had, and may still have, under various modifications, considerable vogue on the Continent; and a few years ago it was much used in London. It does not, indeed, act like the ball by blocking the lower cavity of the pelvis; but it depends greatly for its efficacy upon stretching out the upper part of the vagina. The wings, when expanded *in sitû*, present margins narrow enough to bury themselves in a groove which they form in the vagina; after a time the vagina contracts below this groove, ulceration and granulation take place, and the granulation projecting through the fenestræ meet and unite, and thus the pessary is incarcerated. I have experienced considerable difficulty in extracting the instrument under these circumstances. They can only be liberated by drawing down the instrument, and dividing the incarcerating tissue. And sometimes the ulcerative process perforates the bladder or rectum. I do not say that these accidents are common, but considering the frequent carelessness of the class of women who use pessaries, we ought not to use instruments which require constant medical observation.

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* "Monatsschrift für Geburtskunde," 1858.

The Hodge or lever-pessary answers most of the indications with the least amount of drawbacks. It is of essential importance to bear in mind what is too often forgotten—namely, that it is a lever. A lever must be freely moveable. The lever-pessary, to act properly and safely, must float in the pelvis. Hence the correlative condition that the uterus itself must be moveable. The lever is simply held in the vagina. It should not take any bearing upon the walls of the pelvis; to make it do this would be to degrade it to the level of the old ring-pessaries, and to sacrifice its principle of action. This is what happens if too large an instrument is used. Then the vagina will be put on the stretch, its elasticity will be impaired, leverage is lost, and the pessary pressing unduly may cause inflammation and ulceration.

The best material is flexible white metal. This admits of moulding by the surgeon. As sold the shape is rarely suitable. The best general form is that, when viewed edgewise the shape is sigmoid, the upper limb so curved as to be nearly concentric with the hollow of the sacrum when *in sitû*. The upper or sacral limb, when viewed in front, is wider and flatter than the lower or pubic limb. If the upper limb is convex, it can only touch the globe of the body of the uterus by a point, and thus the uterus may glide aside.

Let us apply a lever to a case of prolapsus, with engorgement of the vaginal-portion. This can be done with safety, because the pessary does not, like Zwanck's or many others, touch the os uteri. We select one moulded to the form of the vagina—that is, when viewed laterally, of a sigmoid shape. The size may be determined approximately by the measurement taken of the vagina by the finger. The length should be such that whilst the upper limb will rise into the vaginal duplicature behind the cervix uteri, the lower limb will sit behind the symphysis pubis well above the meatus urinarius. If it project below this, it will be troublesome, and be liable to expulsion. Its breadth should be such as not to stretch the vagina.

The mode of action is as follows:—During inspiration or exertion, the intestines driven down upon the uterus and bladder cause the anterior wall of the vagina to descend. The lower limb of the pessary being applied to this wall is carried down with it, and the upper limb necessarily rises in the opposite direction, lifting the roof of the vagina and the uterus, and keeping the fundus of the uterus inclined forwards. So long as the body of the uterus is maintained in anteversion, it can hardly suffer prolapsus. The leverage action of the pessary is also greatly aided by the posterior wall and floor of the vagina. This at the lower part forms a thick elastic and muscular structure, which, partly by its contractile property, and partly under atmospheric pressure, is normally kept in close apposition to the anterior wall giving it material support, and thus constituting one of the greatest impediments to prolapsus. The pressure so exerted of course will bear upon the upper limb of the pessary, which is embraced in the vagina. The sphincteric action of the vulva also comes in aid. This, contracting the outlet, helps to support the instrument above it. The instrument is figured under the treatment of "Retroversion" (see page 720).

The instrument should be worn continuously. It is not necessary to remove it at night. It does not prohibit intercourse, although it would often be better that this should be avoided. Conception has often taken place whilst it was being worn. As it requires accurate adaptation, the patient or a nurse cannot always be trusted to remove or replace it. But by help of diagrams and direct demonstration this may be accomplished. I have several patients who manage the instrument with perfect precision.

After a time—several weeks, or perhaps months—the uterus having been kept in position, the vaginal-portion being prevented from chafing against the lower part of the vagina, engorgement will have subsided, and the supports of the uterus will have recovered tone.

In many cases, under proper adjuvant treatment, such as the use of local astringents and general tonics, a cure is effected. The uterus is sustained by its natural supports. If this favourable result is not more frequent, it is because so many interfering conditions occur.

It should be enforced as an imperative rule that women wearing this or any other pessary should have it removed at fixed intervals, to avoid mischief, and to observe the condition of the parts.

The manœuvres for introducing the lever-pessary are described under "Retroflexion."

Some modifications of Hodge's pessary, designed to meet special cases, or to obviate special inconveniences, have been designed. One of Professor Hodge's original forms was that of the letter U, the legs being curved. The two ends being applied behind the symphysis have been found to dig holes into the bladder. A great gain was effected when these pointed ends were got rid of, by completing the ring. I have generally found it possible to obviate all trouble by widening the lower arch—that is, by making the transverse portion a little straighter. This completion of the ring by adding the transverse portion, increases the leverage power, since it is the central portion of the vagina that descends most.

If there be marked vaginal cystocele or rectocele, with large yielding vulva, it may be difficult or impossible to get a Hodge to act. It will generally fall out, and even if it keep in, the conditions upon which its leverage action depend are so feeble, that we must turn to other means.

When the Hodge fails, we have often a valuable resource in other forms of pessary, which act upon somewhat different principles. The next form to try is *the stem-and-cup pessary.* (See Fig. 126.) To a certain extent, this, I believe, also acts upon the principle of a lever, but it does not depend entirely upon it. Here, as in the case of the lever, it is important to select an instrument as small as will answer the purpose. It consists of an upper expanded portion, the cup or corolla, which receives the vaginal-portion, and a somewhat tapering cylinder, curved to correspond with the pelvic or vaginal curve. It is likened to a horn. The whole is hollow, for the escape of discharges.

Now, the bare instrument in this form will, under favourable circumstances, maintain itself *in sitû,* and act curatively. The study of them will best explain upon what principles the instrument acts. When the instrument is *in sitû,* the vaginal-portion resting on the corolla, the narrow stem is grasped by the vagina, which contracts upon it. As the instrument represents a cone, of which the apex is directed downwards, a force grasping it necessarily carries the cone upwards, and the uterus rises with it. Then the cone, by its length, is also a lever, and is subject to exactly the same influences as Hodge's lever pessary. That the instrument acts in this way is proved by the facts that in suitable cases when the vagina is contractile, the pessary is self-retaining, and that in many cases it ends by curing the prolapsus.

In other cases, where the power of the vagina is insufficient to grasp the stem, its retention is aided by external elastic bands which are carried up in front and behind, and attached to an abdominal belt. The elastic bands, yielding at every inspiration, permit the natural ascent and descent of the uterus, and obviate the concussion and violence which rigid external supports would cause. The material of these pessaries should be vulcanite.

The introduction is not difficult. A finger of the left hand is introduced into the vagina, and presses back the perineum; the corolla of the pessary held in the right hand is slipped by its edge beneath the guiding finger, and in front of the fourchette, being made to press backwards, so as to make its way in by expanding the perineum. The direction given is towards the hollow of the sacrum, and away from the symphysis pubis.

If the vagina be very much relaxed, if there be any considerable amount of rectocele and cystocele, the corolla must be proportionately large, or the folds of the vagina will bag over the corolla, and drag the uterus down by the side of it.

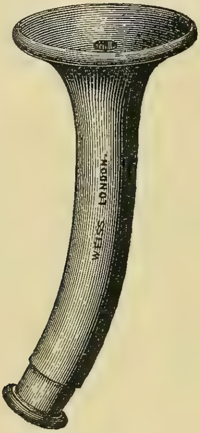
WEISS LONDON.

FIG. 126.

THE CUP-AND-STEM PESSARY.

When there is no vaginal contractility, there is nothing but the external elastic bands to depend upon to keep the pessary *in sitû*. But even under these circumstances it is still a very useful instrument. This is the case in prolapsus and procidentia of aged women. When the functions of ovulation and pregnancy are at an end, the uterus undergoes atrophy, losing bulk, increasing in hardness. At the same time, the cellular tissue of the pelvis loses much of its fat; the vessels having less call upon them for supplies, bring less blood. The vagina, too, partakes in the atrophic process. The general result is a small uterus imbedded in shrunken tissues. The padding is gone, the uterus falls. Especially is this the case if the woman leads a laborious life. Under great exertion in the standing or kneeling postures, the ill-supported uterus easily falls through the pelvis. Hence, the prolapsus and procidentia of senility being mainly the consequence of atrophy, nothing short of mechanical support will avail.

Another class of pessaries act upon the principle of directly supporting the anterior wall of the vagina. If this is kept up, as we have seen, the uterus is kept up with it. The essential constituents of all these are: first, a disk of suitable shape which is adapted to the anterior wall of the vagina at the junction of its roof with the vaginal-portion; secondly, an elastic wire which supports the disk and which is carried out of the vulva and curved up in front, to be connected with a pad which is secured by a spring or bandage against the symphysis pubis. Professor Martin used one which, instead of a disk taking its bearing upon the anterior vaginal wall, has a ring-disk which receives the vaginal-portion. Dr. Whitehead, of Manchester, uses one constructed on this principle, which is very effective. Dr. Gibson, of Newcastle, describes (*Brit. Med. Journal,* 1869) a truss adapted to support the vulva.

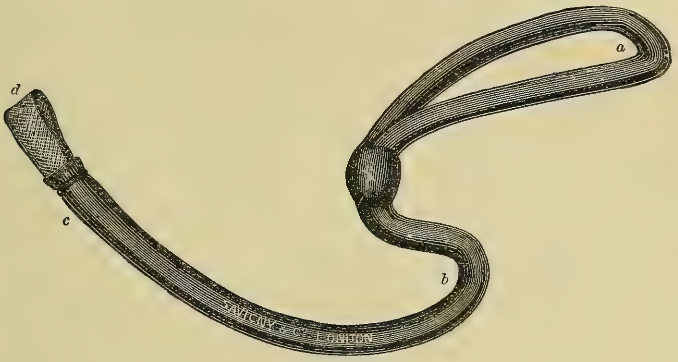

Fig. 127.

SCOTT'S PESSARY.

a, the intra-vaginal part; *b*, the part which fits the perineum; *c*, the part which lies between the nates; *d*, an elastic loop to which a tape is tied, and which is in turn tied to an abdominal band.

Professor Thomas has contrived a modification of the Hodge's pessary sometimes effective in extreme cases of prolapsus. It is made wider, and the sigmoid bend is more pronounced. It acts not altogether as a lever, but takes a support on the floor of the pelvis.

In practice I find it inferior to a *pessary designed by Dr. Scott, of Woodstock, Canada* (see Fig. 127). This being itself elastic and supported by an elastic band outside respects the normal movements. It can be taken out and replaced by the patient. The size, of course, must be adapted to the individual circumstances.

Where internal pessaries cannot be borne or do not answer, many patients find relief in wearing a firm perineal pad, attached by straps before and behind to an abdominal belt. This contrivance is a kind of artificial perineum. The pad strengthens the floor of the pelvis, and its pressure by keeping up the posterior wall of the vagina in contact with the anterior wall, prevents the uterus from descending.

Before the introduction of Zwank's and Hodge's pessaries, the use of external supports was much more frequent than it is now. But we should not lose sight of what has often proved a valuable remedy. Hull's utero-abdominal supporter is the best known; and another—Dr. Ashburner's—is highly commended by Dr. West and others. I have seen many cases in which one of these appliances answered the indications of keeping the uterus inside the pelvis, and of enabling the patient to get about, and even to go through severe work with comparative comfort. "Each of these instruments tightly embraces the hips. Hull's is furnished with a large padded metallic plate, fitted over the pubes, and Ashburner's is fitted with a similar plate, fitted over the sacrum. The chief utility of these metallic plates is that by their firm yet gentle counter-pressure they relieve the sympathetic pains referred to the back in one case, or the dragging and distress in the region of the ovaries in the other. To both of them a strap passing between the legs, with a perineal pad is adapted, and though it can be dispensed with at pleasure, will be found of great service in all cases of considerable relaxation of the vagina, with disposition to actual procidentia, when used either alone or in combination with some form of internal support." (West.)

The strap and perineal pad have, indeed, the disadvantage of heating the parts, and of keeping up leucorrhœal discharge; and I have even known them to cause hypertrophy of the labia vulvæ.

In all the contrivances we have as yet discussed, the support is given below the uterus, and they are designed to meet the uterus, and to resist its fall. But whilst adapting these often indispensable aids, we should not forget that we may often do much to take off the superincumbent pressure which is the active factor in producing and maintaining the prolapsus. A well-adjusted abdominal belt will do this; and patients often experience considerable relief from this contrivance alone.

Some form of internal support may often be usefully combined with the abdominal belt.

General Treatment.—But we should not confine our attention too exclusively to mechanical means. Portal congestion, hæmorrhoids, dilatation of the rectum, and retrograde disorder of the digestive system, so frequently accompany prolapsus, and so surely aggravate its consequences, that special attention should be directed to mitigate these conditions. Alteratives, such as mercury or podophyllin, chloride of ammonium, and tonics as strychnia, quinia and iron will often be of signal service. We must act, in short, on the general principle of removing or mitigating all intercurrent or associated morbid complications. Amongst the most common are the climacteric affections, which have already been discussed.

Surgical Treatment.—Where artificial mechanical support adapted internally or externally is excluded, or where, for other reasons, a radical cure is indicated, several *surgical proceedings* are available. The several operations are based upon different principles, arising out of the different views entertained as to the causes of prolapsus.

The first attempts at a radical cure were based upon the simple idea of closing the vagina or vulva. The following historical account is taken from S. Cooper's *Surgical Dictionary*:—

"The late Dr. Hamilton formerly suggested the propriety of endeavouring to relieve very bad and confirmed cases of prolapsus uteri, by exciting adhesive inflammation in the vagina, so as to bring about an agglutination of its surfaces. However, notwithstanding the more or less partial closure of the vagina, occasionally met with in the practice of surgery and midwifery, every pathologist is aware of the difficulty of making a mucous tissue undergo the adhesive inflammation; and this consideration led Dr. Hamilton not to attempt it. A more valuable and practical operation is that of treating such cases by approximating the pared surfaces of the labia, and uniting them by suture. Dr. Ireland tried this method in Dublin, and has published an account of the success which attended it. (See *Dublin Journ. of Med. Science.* vol. vi., p. 484.) Cruveilhier prefers to this proposal the plan of bringing about a contraction of the upper part of the vagina, by touching it with the nitrate of silver, or an acid. An anonymous writer remarks that a similar operation has been several times since performed by Velpeau, Boivin, Laugier, and others. Some produce adhesions between the opposite surfaces by means of wounds made with the knife; others by means of sloughs and granulating surfaces, resulting from the application of escharotics. Dr. Ireland seems to attribute the merit of devising this operation to Dr. Marshall Hall; but it is probable that Girardin, who proposed it in the year 1823, has the claim of priority. (See *Dublin Journ. of Med. Science,* vol. x., p. 126.) For an historical account of this operation, I must refer to the *Annali Universali di Medicina,* edited at Milan by Omodei, for December, 1835. In 1831 the operation was performed by Dr. Fricke, of Hamburg, with a complete successful result, and he is a strong advocate for it.

"The following quotation from Dr. Heming's translation of Madame Boivin's work, p. 53, affords some particulars of Dr. Marshall Hall's operation, which appears to have consisted in the excision of a strip of the mucous membrane of the vagina: 'Dr. Marshall Hall has lately cured a case of complete prolapsus uteri by artificial contraction of the vagina: a strip of the mucous membrane, an inch and a-half wide, was removed along the whole of the canal, and the wound was sewed up. We hear nothing of hæmorrhage, and are assured that the patient suffered neither pain nor fever after the operation.' In a note, the translator mentions that there was scarcely any hæmorrhage, and that in November, 1833, two years after the operation, the uterus and bladder were found by Mr. Vincent to be perfectly supported in their situation.

"Dieffenbach treated bad cases of prolapsus uteri by removing an oval piece of the membrane of the vagina; a plan suggested to him by the observation of a case in which some parts of the vagina sloughed away, while the uterus was in a state of prolapsus. The uterus and the remains of the vagina were reduced during the granulating process, and the result was a complete cure of the disease."

In recent years modifications and extensions of the proceedings initiated by Hamilton, Marshall Hall, Fricke, and Dieffenbach, have been devised under a more accurate knowledge of the causes of the displacement and of the conditions of cure. These have accordingly been attended with a far greater amount of success.

The operation which first attracted attention arose out of that for restoration of the lacerated perineum. It was observed that prolapsus not infrequently arose in connexion with rent perineum. The restoration of the perineum, especially if the rent extended through the sphincter ani, was indicated independently of consideration for the prolapsus. The restoration of the perineum was an effective means of restoring the integrity of the vagina, which is one of the chief supports of the uterus. Then as it was observed that, in many cases, prolapsus uteri was complicated with vaginal rectocele, it was hoped that by narrowing the vagina in its posterior wall, it would be so far restored to its normal condition, that it would be able to support the uterus. As we have seen, the posterior wall of the vagina and the perineum form a most efficient support for the anterior wall. Much benefit might, therefore, reasonably be expected from making good this part. Mr. Baker Brown was one of the earliest and most energetic advocates of this plan. A considerable number of operations of this class have been performed by him and others, and with varying degrees of success. But there are clinical observations in abundance to prove that it is based upon imperfect appreciation of the causes of prolapsus. In many of the cases, notwithstanding the narrowing of the posterior wall of the vagina, and the union of the labia much anterior to the normal fourchette, the prolapsus after a time returned. The true factors of the prolapsus remaining untouched, gradually the uterus made its way down again, and distending the new perineal floor appeared outside the vulva. It cannot, therefore, be called a radical cure, except in those cases in which vaginal rectocele is the essential cause of the prolapsus. Nor is the relief often permanent, unless the vulva be almost completely occluded. It has been seen that the small vulva and perfect hymen of the virgin are not an absolute safeguard against prolapsus. The narrowing of the vulva simply forms a shelf to receive the falling uterus.

The operation is so similar to that for restoration of the rent perineum, that the description of the two will be given together.

An operation that seems based upon a sounder view of the pathology of prolapsus, is that proposed and practised by Dr. Marion Sims and Dr. Emmet, of New York. Its object is to strengthen or brace up the vagina near the junction of the cervix uteri with the bladder. It consists in removing a portion of mucous membrane from the anterior wall in the form of a V, the open part of the V embracing the cervix uteri, and then uniting the sides by sutures. I have performed this operation as well as the preceding one several times. Although in each case the cure seemed perfect for some time afterwards, the parts gradually opened out again, and the prolapsus was reproduced.

Then there is a third operation performed in yet a different part. It may be distinguished as Huguier's. It is the amputation of the hypertrophied cervix. The principle appears to be different from Sims' operation, but I think they touch each other in their mode of action. It is difficult to amputate the vaginal-portion of the cervix without removing a portion of the contiguous mucous membrane in front; and when healing, a process of cicatricial contraction anteriorly necessarily follows. I have seen this in cases where nothing but amputation of redundant vaginal-portion was contemplated. But still the proceeding has independent advantages. In the first place, the elongated cervix is *pro tanto* shortened; and in the second place, a process of altered nutrition, attended by retraction in the remaining portion, is set up, by which a still further shortening is effected.

Huguier's operation consists in taking away, together with the upper extremity of the vagina, the whole length of the neck, and, if necessary, the lower part of the body of the uterus, removing it by an incision slanting from without inwards, after having previously detached the bladder from the part to be excised. In connexion with this rather formidable proceeding, it is desirable to state the conditions which, in Huguier's judgment, absolutely contra-indicate it. These are, a capacious pelvis and a large opening at the vulva, more or less laceration of the perineum, and considerable relaxation of the soft parts at the pelvic floor. If these conditions exclude the operation, the cases must be very rare in which its performance would be admissible; and an operation which cannot be applied in the cases which most urgently demand relief, can hardly be regarded as a very important acquisition to science.

To this criticism must be added the serious dangers incurred of opening the peritoneal cavity, or the bladder, of hæmorrhage from dividing the vessels high up at their entry into the substance of the uterus, and of consequent pyæmia.

In 1860, Scanzoni* had amputated the vaginal-portion sixteen times: nine times with Siebold's scissors, three times with the galvano-caustic. He says the operation is always dangerous.

The operation advocated by Gustav Simon, of Heidelberg, is based upon the idea of strengthening the posterior wall of the vagina so as to obtain a firm support to the uterus and anterior wall of the vagina. I am indebted to Dr. James R. Chadwick, of Boston, U.S.A., for the following condensed account. Simon calls it "posterior colporrhaphy." It consists in removing the mucous membrane from a large portion of the posterior vaginal wall, and bringing the two sides of the denuded surface together, so as to produce great constriction of the vagina.

The operation is generally performed while the vagina is dilated laterally by a broad flat fenestrated speculum—a modification of Sims's. Through the fenestra the mucous membrane and a little of the subjacent tissues may easily be removed with the scissors or bistoury up to within $\frac{3}{4}$ to 1 inch of the vaginal insertion into the cervix uteri. The whole thickness of the vaginal wall should not be cut away, for a less firm cicatrix would then result. The upper end of the pared surface should not be pointed, but almost square, so that, when the healing process is completed, a sort of pouch is formed above the cicatrix, into which the cervix may sink and be retained, instead of being free to insert itself into the restricted canal of the vagina, where it would gradually force its way down, dilating the parts, and finally reach its former prolapsed position. At the vaginal entrance the denudation of the mucous membrane is carried out upon the posterior halves of the two labia majora, so that, when the latter are approximated and unite, the perineum is greatly lengthened and additional support obtained. The opposite edges of the wound are then brought together by fine silk sutures, which are allowed to remain four to six days or longer. A union takes place throughout the whole extent of the surfaces thus applied to each other, and a firm, dense, cicatricial band is obtained, running almost the whole length of the posterior vaginal wall. Professor Simon claims the following advantages for this method of operating:—That it forms a pouch in which the cervix rests; that a firm barrier is by it opposed to the exit of the uterus at the point toward which that organ naturally gravitates; and that the vagina is made narrower and more rigid. In addition, the uterus is not drawn down by the contraction of the cicatrix, as occurs in Sims's operation, owing to the lower extremity of the cicatrix in the latter being almost fixed by its attachments to the unyielding pubic arch. Simon had tried Sims's procedure in a number of instances with temporary relief, but after a time the procidentia invariably recurred. Having operated more than thirty times by his own method, with one exception, he effected perfect and permanent cures, although the patients were chiefly poor peasants who did the heaviest kind of work in the fields. I have had more success with Simon's operation than with any other.

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* "Beiträge zur Geburtskunde," 1860.

The late Dr. Tracy, of Melbourne, performed an operation which unites the anterior and posterior colporrhaphy and the perineorraphy. The three proceedings are carried out at the same sitting. Like Simon, he was able to say that his patients were restored to the capacity of earning their living by hard work.

The conclusion I have arrived at is, that in some specially appropriate cases each of these three operations will succeed; that there are many cases in which one of them singly will effect but little good; and that a combination of two or all three will often be necessary for complete success.

The course to be adopted may be stated as follows:—1. When there is prolapsus without marked elongation of the cervix, remove a portion of the mucous membrane of the anterior wall of the vagina on Sims's plan. 2. If there be considerable elongation, amputate a portion of the redundant neck, and at the same time remove a triangular piece of the mucous membrane just in front of the cervix, the base of the triangle merging in the stump of the cervix, and bring the sides of the triangle together by sutures. 3. If there be considerable rectocele, with impairment of the perineum, perform the perineal operation, or posterior colporrhaphy. 4. Where the three conditions co-exist, all three operations should be performed. It will generally be best to do this in successive operations.

There is undeniable truth in this passage from Dr. West:

"It is surprising how much the size of the procident womb is reduced after its return within the vagina by a month's rest in bed, how completely a long-standing ulceration of its orifice heals, and how effectually the organ is retained afterwards within the pelvis by a bandage. If in the majority of these cases an operation were performed, a similar result would doubtless be obtained; the month's compulsory rest in bed would be followed by the same diminution in the size of the uterus, and the elongated perineum would answer for a time at least the same purpose as the perineal pad of an ordinary bandage; while by slow degrees the ligaments in the one case, as in the other, might regain some measure of power, and the womb might cease to fall down externally."

Mr. Walter Whitehead, in a very able clinical memoir * based on a considerable number of operations performed by himself, looking back upon those operations, is strengthened in his opinion that to cure prolapsus we must aim more to relieve the pressure from above than to diminish the weight of the uterus, or to increase the strength of its supports. Such operations, he thinks, should be reserved for a last resource in the isolated cases, where all other means of supporting the uterus have been found useless. Yet his mode of operating seems to have been well devised and executed, and the success fair. It consisted in removing a triangle of mucous membrane from the posterior vaginal wall, the apex being towards the os uteri; another triangle from the anterior wall with the apex downwards, and in amputating the cervix.

The amputation of the elongated vaginal-portion demands great care. There is very serious risk of opening the peritoneal cavity behind. Douglas's pouch, which in the normal condition descends as low as the upper fourth of the vagina, that is, considerably below the level of the vaginal-portion, is, in the ordinary condition of hypertrophic elongation, carried downwards in the same proportion. A glance at the drawing, Fig. 112, p. 628, taken from nature, shows this very clearly. The bottom of Douglas's pouch is outside the vulva, and it would be impossible to amputate any considerable part of the protruded cervix without opening into it. The accident, indeed, has several times happened. Marion Sims relates a case; Dr. Meadows has related another, and other cases are known.

The accident is especially likely to occur if the chain or wire-écraseur be used. During the tightening of the chain especially, the traction is apt to drag within the grasp tissue beyond the line selected for amputation. To obviate this, two measures are useful. First, the part to be amputated may be dissected away from its vaginal investment, so as to isolate

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* "Manchester Medical and Surgical Reports," 1871.

completely from the peritoneum the part which is to be included in the loop of the chain or wire. Secondly, the cervix may be transfixed by a long straight needle just above the part where the chain or wire is applied. This will present an effectual barrier to the in-dragging of any tissue beyond what is intended. The accident may also be avoided by dissection and amputation with the knife. Even greater security is attained by removing only a small portion of the cervix. The piece removed need not be large. The retraction attending cicatrization completes the cure. And Huguier's method of removing a conical portion gives further security. The danger of pyæmia may be almost eliminated by operating under the carbolic spray.

The mode of amputating redundant vaginal-portion by the galvanic cautery-wire is illustrated at p. 633. The opening of the peritoneum is not, however, necessarily fatal, and the surgeon should be prepared to meet the dangers attending it.

Among the more important congenital forms is the *extra-median position of the uterus with excentric implantation into the vaginal roof.* The uterus lies to right or left out of the median line, its form being symmetrical, the broad ligament of one side is small, the other by so much the wider. On touching by vagina the finger passes by one side of the vaginal-portion into an elevated empty roof, and on the other side into a shallow space. This anomaly, says Rokitansky—and from clinical observations on the living I venture to confirm his statement—is not uncommon.

Some of the anomalies of position are congenital, some acquired. I have been brought by long observation to the conclusion that the congenital aberrations from the normal position and shape of the uterus are far more frequent than is commonly supposed.

The *oblique position.* This occurs sometimes with the well-formed uterus, but commonly it is combined with oblique or one-sided formation of the uterus; and sometimes a *congenital lateral inflexion* is found.

Inflammatory adhesions may bind the uterus down in almost any position. Thus, in St. Bartholomew's Museum (No. 32.38) is a specimen where there has been inflammation of the pelvic portion of peritoneum, and irregular adhesions have formed about the ovaries, Fallopian tubes, and broad ligaments. The left broad ligament is much contracted, and the body of the uterus is thus drawn to the left side, so that its axis is almost at a right angle to that of the vagina.

Dislocation of the Uterus upwards (*Elevation of the Uterus*).—The uterus rises when enlarging from pregnancy, fibroid tumours, accumulation of blood, mucus, or other matters in its cavity; or it may be drawn or pushed upwards by tumours, enlarged ovaries, hæmatocele, or by adhesions, or hernia of the tubes or ovaries, which will drag it to the side of the hernia. Elevation of the uterus is attended by elongation or stretching of the vagina, smoothing-out of its folds, unfolding of the duplicature which constitutes the roof of the vagina, and the vaginal-portion; elongation of the cervix, atrophic attenuation, and lastly, lesion of continuity of the cervix. Sometimes this combined process of compression and stretching effects *the actual separation of the body of the uterus from its neck.* Mr. Nunn exhibited (see *Pathol. Trans.*, vol. x.) a uterus, the body of which was above twice or thrice its normal size, and which had undergone nearly complete isolation from its cervix, which was smaller than normal. The attenuation was due to the pulling of an ovarian tumour.

Dr. Hare exhibited to the same society an enormous ovarian tumour weighing 106 lbs., removed from a dead woman. The vagina was stretched to 6½ inches long, it was inclined very much towards the left, and at its extremity the os uteri opened by a small aperture into the cavity of the uterus. This organ, like the vagina, was firmly adherent to the anterior surface of the tumour, and, like it, was exceedingly elongated, being 7½ inches in length. Its body was also much thinned out and flattened. These cases show that the uterus, if subjected to dragging and pressure from an ovarian tumour being adherent to it, is liable to similar transformations as the Fallopian tube in like case. I have seen quite similar changes produced in the uterus by its outer wall forming part of the sac of an extra-uterine gestation.

Analogous conditions may be produced by fibroid tumours in the uterus itself.

Simple compression between a tumour and the symphysis pubis may produce similar attenuation of the uterus.

The *uterus may enter into the contents of a hernial sac,* constituting *hysterocele.* It has been found in inguinal and femoral hernia, in hernial openings of the abdominal aponeurosis between the recti muscles; in an ischiatic hernia, and in hernia of the foramen ovale.

Certain displacements of the uterus are caused by pressure. Thus, a tumour behind the uterus, or a hæmatocele in Douglas's pouch, will push the organ bodily *forward,* without affecting its axis of suspension, compressing it against the symphysis pubis. It may be pushed bodily *backward* by the distended bladder (see Fig. 38, p. 130). A tumour in the side of the pelvis may push the uterus over to the opposite side.

In either of these cases the uterus is liable to become elongated as well as deflected by the pressure. In some cases of ovarian tumour in the earlier stages the fundus of the uterus is pulled towards the affected ovary, throwing the os upwards in the opposite direction, so that the uterine axis lies almost across the pelvis, but more commonly the fundus is thrown over to the opposite side.

A controversy was long keenly waged, and I do not know that it is even yet set at rest, as to which was the antecedent, and therefore causative condition—namely, engorgement and inflammation of the uterus, or displacement. One school held that the displacement entailed the engorgement, the other school maintained that the engorgement produced the displacement.

There was right on both sides. But both sides greatly overlooked a third chapter in the history—namely, the frequent occurrence of flexions and versions as a congenital disposition.

THE INCLINATIONS OR VERSIONS AND FLEXIONS OF THE UTERUS.

It is desirable to start by defining the meaning attached to the terms employed in describing the displacements of the uterus. Naturally, we understand by displacement, any deviation from the normal position of the uterus. If we could exactly determine *the normal position,* we should have a fixed point of departure from which to measure the various deviations. But this fixed point it is not easy to settle. We must allow a certain range of location to a mobile organ like the uterus. Assuming, however, as we may, that the uterus is suspended in the upper part of the pelvic cavity, so that its fundus is on a level with the plane of the pelvic brim, that its inclination coincides nearly with the axis of the pelvic inlet, and that it floats between bladder and rectum about midway between the symphysis pubis and the sacrum, but somewhat nearer to the symphysis, we shall have a standard position sufficiently defined for clinical purposes.

Another point necessary to determine is what Aran calls the *axis of suspension* of the uterus. This is defined as follows:—Just above the vaginal-portion the cervix adheres to the bladder; behind, it is free, and receives about the level of the union with the bladder, the utero-sacral or Douglasian ligaments. This point is the axis of suspension. Around this the body of the uterus can move in all directions. This axis is, however, susceptible of displacement *en masse,* owing to the flexibility and elasticity of the constituent parts. It ascends in the recumbent and prone postures and before the examining finger; it descends in the erect posture, and in prolapsus, and in straining efforts. It also rises and falls under expiration and inspiration.

We may define version as inclination of the uterus forwards or backwards, or to either side, with regard to its normal axis, the uterus retaining its normal slight curve. The uterus, in version, rotates upon its axis of suspension, so that if the fundus dip forwards and downwards, the vaginal-portion will rise in the opposite direction; and if on the other hand the fundus rise and incline backwards, the vaginal-portion will come forwards. In the first case there will be a corresponding degree of what I have called anterior vaginal roof-stretching; in the second place there will be a corresponding degree of posterior vaginal roof-stretching. The anterior vaginal roof-stretching reaches its highest degree in early pregnancy, when anteversion of the enlarging uterus throws up and back the vaginal-portion under the sacral promontory, carrying the vaginal roof back with it. The diagram, Fig. 57, p. 175, will make this clearer. Of course it is not to be taken that the definition given is strictly true. Especially, the axis of suspension is rarely fixed. It moves *en masse* with the bladder, which helps to form it. It is deflected a little backwards or forwards when the uterus inclines or is flexed. This varies with the size of the uterus and other circumstances.

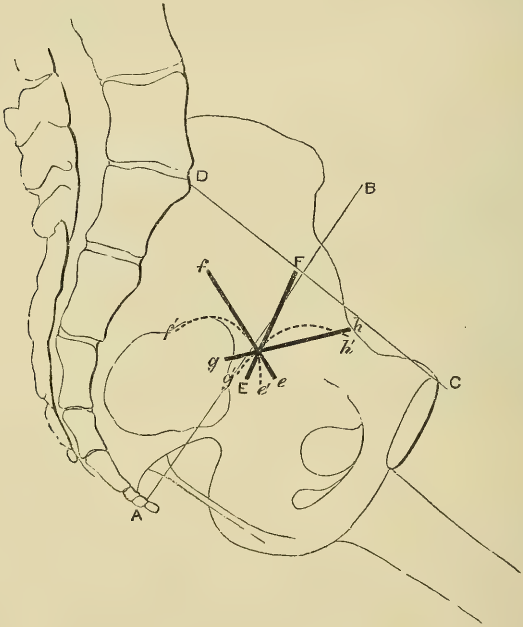

FIG. 128.

DIAGRAM TO ILLUSTRATE VERSIONS AND FLEXIONS OF THE UTERUS (R. B.).

A B. Axis of inlet of pelvis. C D. Plane of brim. E F. Normal axis and position of uterus. *e f.* Retroversion. *g h.* Anteversion. *e' f'.* Retroflexion. *g' h'.* Anteflexion.

Flexion consists in bending of the uterus upon itself. The axis of suspension may not greatly shift. In *anteflexion* the body is bent forwards, the vaginal-portion points downwards, being, perhaps, but not necessarily, thrown up a little backwards. In *retroflexion,* the body is bent backwards, the vaginal-portion still points downwards, and is, perhaps, but not necessarily, thrown a little forwards and upwards. In short, the flexions often involve a little version, that is, a slight rotation of the whole uterus upon its axis of suspension.

The annexed diagram will serve to illustrate the versions and flexions of the uterus. (See Fig. 128.)

In version the entire uterus revolves on its transverse axis, maintaining its ordinary shape. As a lever, the dipping of the body or upper end elevates the lower end in the opposite direction in a corresponding degree. In flexion, the lever may be considered as broken in its middle, so that dipping of the body gives only a small degree of elevation to the other end. Thus the os in version looks either forwards or backwards, and is high in the pelvis; whilst in flexion, the os still looks downwards, and is more central and often lower in the pelvis.

As *anteversion* and *anteflexion* are exaggerations of the normal conditions, we may fitly notice these first. Anteversion was carefully described by Levret. During the period of development, the uterus is bent upon itself, forming a curve or flexure, with the concavity directed forwards. This state of anteversion and anteflexion, commonly continues in a more or less marked degree until the advent of puberty. It frequently persists in virgins and the sterile throughout life. Anteflexion, indeed, is a condition disposing to sterility, and is often associated with a conical vaginal-portion, a small os uteri externum, and a short vagina, all indications of imperfect development. Dysmenorrhœa, with or without excess of menstrual flow, commonly attends. When not of primitive origin, it is sometimes induced by the development of a fibroid tumour in the anterior wall of the uterus. The bend is commonly at the junction of the body and neck; and here some degree of atrophy is often found. The fundus falls into the peritoneal fold behind the bladder, and thus sinks into the bladder, depressing it, leading to irritability of the organ and dysuria.

During early pregnancy, the fundus of the uterus inclines more downwards and forwards, the os tilting more upwards under the promontory, thus increasing its natural anteversion. But, the fundus pointing above the symphysis pubis as the uterus enlarges, it grows out of the pelvis, clearing the brim, and gradually rising, so as to assume a direction more approaching coincidence with that of the axis of the brim. The bladder also filling below, tends to lift the fundus out of the pelvis. In some rare cases, however, of early pregnancy, the fundus has been locked behind the symphysis pubis in complete anteversion, forming the counterpart to the retroversion of the gravid uterus. (See V. Hüter, *Monatsschr. für Geburtskunde,* 1863.) The more common form of anteversion of pregnancy, however, is rarely marked before the fifth or sixth month, and then there is usually flexion as well. It occurs especially in women who have had many children, and whose abdominal walls are exceedingly relaxed, the recti muscles, perhaps, having been stretched apart. Hohl says it is favoured by too great inclination of the pelvis. (Hohl, *Lehrb. der Geburtshülfe,* 1862.) It is favoured by wearing stays, which pressing on the growing uterus at the fundus, help to throw this part downwards and forwards. In this way, at term, we find the uterus lying on the symphysis, the cervix curving a little downwards into the pelvis behind, whilst the body and fundus hang downwards in front of the pelvis, sometimes even approaching the knees. The management of this condition is of course entirely obstetrical. It is carefully described in my work on *Obstetric Operations.*

Anteversion also occurs from the body of the uterus being overweighted, as by hypertrophy, when there is ever so little forward inclination of the organ. The uterus moves as a lever upon its axis of suspension. Its longer arm is above this axis or hypomochlion, so that the most moderate increase of bulk and weight at the extremity of this arm weighs it down.

This condition of hypertrophic enlargement of the body of the uterus is not uncommon. I have seen it arise from imperfect involution, from congestion kept up by menorrhagia, over-exertion, and tumours. In women past the climacteric the foundation is commonly laid during the childbearing period, but upon this foundation of sub-involution, a superstructure of further hypertrophic growth is laid by the obstruction to the portal circulation which so frequently exists after the climacteric. When this process is once set going, it tends to maintain itself. There is a more or less active developmental force kept up in the uterus; blood is attracted to it, retained in it; there is hæmostasis, and this condition constantly leads to increased deposit and bulk of the organ affected. This attraction of blood is continually liable to excess; and then the uterus being an organ designed for, and habitually disposed to, the shedding of blood, hæmorrhage takes place. Long past the climacteric, and therefore probably long past the influence of ovarian stimulus, these hæmorrhages observe a degree of order in recurrence. They do not, indeed, recur with such striking regularity as do the menstrual discharges; but still they evince the subjection of the economy to the law of periodicity.

The *flexions are frequent,* both congenital and acquired. These are of all degrees, varying from the slightest bending, or bowing, to the extreme degree in which the body is doubled up upon the cervix, as in Fig. 136.

A slight degree of anteflexion must be considered as normal. It is the persistence of the infantile state. Indeed, the axis of the uterus is rarely quite straight. This axis is represented by a slight curve, passing through the cavities of the cervix and body. It corresponds more or less closely with the curvilinear axis of the pelvis. This is a point important to remember, because the instrument makers invariably sell the uterine sound set at an angle from the shoulder, which marks the length of the two uterine cavities, this intra-uterine portion being quite straight. To pass in easily, this portion should be gently curved.

When the anteflexion exceeds a slight degree, it must be regarded as abnormal; indeed, symptoms more or less distressing rarely fail to attend.

The factors predisposing to *acquired anteversion and anteflexion* are 1st, undue softness or flaccidity of the uterine tissue; 2nd, increased bulk and weight of the body of the uterus, increasing leverage of this part. The immediate cause is force acting upon the fundus uteri at its posterior aspect.

1. These conditions are present immediately after labour and abortion, and many cases of flexion date from one of these events. Undue softness, however, as Graily Hewitt insists, may arise from malnutrition.

2. Professor Martin describes as a cause of anteflexion or retroflexion the *sub-involution of the placental site*. Thus, if the placenta had grown to the posterior wall, and this portion remain imperfectly reduced, being thicker and longer than the anterior wall, the fundus will be pushed over forwards, producing anteflexion. If the placenta had grown to the anterior wall, retroflexion would be produced.

3. Virchow bases the origin of anteflexion on the relations between uterus, bladder, and rectum, and chiefly *on the pressure which the distended bladder exerts on the cervix* in the region of the os internum, where the peritoneal boundary of the distended bladder ceases. The atrophy of tissue, found principally at this place, is, he says, caused by this pressure. *Partial atrophy in the region of the uterine neck,* however produced, is a predisposing cause of flexion. This part becoming comparatively weaker, the body is bent down upon the cervical portion, under the superincumbent pressure of the intestines.

In some few cases there is flexion below the os internum, about the middle of the cervix; and occasionally there is a double flexion, one backwards in the middle of the cervix, one forwards at the os internum, so that the uterus and its cervix describe a bending like an S.

4. A *tumour* in the fundus or anterior wall of the uterus.

5. The uterus is occasionally bound down in anteversion by *adhesions.* These may be the result of pelvic peritonitis from hæmatocele in the anterior peritoneal pouch; from puerperal inflammation, or other causes. The following history is not very uncommon:—A woman who had never been pregnant had menstruated regularly until six months previously, when she had "inflammation," and great pain in the abdomen, for which she was leeched and blistered. She was menstruating at the time of the attack. Menstruation irregular since; has dragging pains in the lower abdomen; great irritability of the bladder, frequent desire to pass water. The body of the uterus is enlarged; it is fixed in anteversion, as if growing to the fundus of the bladder; it cannot be moved; the cervix moves in a limited extent; there is a creamy discharge from the os. In this case, it seemed clear that there had been peritonitis, leaving adhesions which bowed down the fundus uteri.

6. A not infrequent cause of anteversion is *coitus.* Under certain conditions, the vaginal-portion is driven backwards and upwards, and inclination of the fundus ensues.

7. Rokitansky says *excessive inclination of the pelvis* disposes to anteversion.

Like most other diseases of the uterus, but in a more marked degree, displacements act in three ways, producing three sets of symptoms.

1. *Functional,* relating to the organ itself.
2. *Mechanical,* by pressure upon surrounding organs.
3. *Remote, or constitutional,* due to the reaction of the two former.

1. *The functional symptoms of anteversion.*—Slight excess of inclination may entail little distress. But if the axis of the uterus become horizontal, so that the fundus rests upon the symphysis pubis, or gets behind it, troublesome symptoms arise. In most cases, probably some enlargement of the body of the uterus precedes the inclination. But in all cases increased enlargement of this part is sure to follow. This is the almost necessary consequence of the impediment which the displacement offers to the return of blood from the uterine vessels. This leads to chronic hyperæmia, and hence a frequent symptom is menorrhagia or metrorrhagia. Leucorrhœa, another mode by which the gorged tissues seek relief, follows the hæmorrhage. The excess of blood collected in the uterus, and the obstacle presented to its escape by the abnormal position, and by the swelling of the tissues, cause dysmenorrhœa. Dyspareunia is a very common symptom. Pain is due to compression of tissue which entails pressure on the nerves.

2. *The pressure symptoms.*—The enlarged fundus presses upon the bladder, and irritates this organ. Hence frequent urgency to pass water, without the want being ever satisfied. The

patient may have to get out of bed many times a night. There is dysuria as well, and occasionally retention, for which the catheter may be necessary. That bladder distress is not more frequent is explained by the fact that the uterus often assumes an oblique position, the fundus not lying in the median line, but to one side, thus avoiding the bladder. The straining causes pelvic pain. If the axis of the uterus is preserved, as in anteversion simple, the vaginal-portion rises under the promontory, protrudes the posterior wall of the vagina, buries itself in the rectum, causing a distinct prominence in that cavity. Hence there is often dyschezia, leading to irritability of the bowel, tenesmus, diarrhœa, or constipation. The pain is commonly increased in the upright posture and by exertion. Hence the patient is soon induced to lead an inactive life.

I have known this projection into the bowel provoke most intense suffering. It has led to the suspicion of disease of the bowel, especially of stricture.

The strong projection against one point of the vagina also causes irritation, leucorrhœa, and sometimes even ulceration at this part.

3. *The remote or sympathetic and constitutional symptoms* are those which ensue upon most other uterine diseases. There is irritation of the nervous centres, and consequent disordered distribution of nerve force to the economy, entailing various functional disturbances. And after a time the hæmorrhagic and leucorrhœal discharges impoverish the blood, and lead to impaired nutrition.

The sufferings are commonly much increased at the onset of the menstrual periods, which are marked by severe uterine colic, attended often by vomiting, hysteria, and other nervous disorders.

The *general course of anteversion or anteflexion* is towards aggravation. There is little tendency to spontaneous reposition. Some amount of accommodation in the course of time may lead to tolerance. But as a rule the artificial reduction of the uterus to its normal position is indicated.

Diagnosis of Anteversion.—The diagnosis is not usually difficult. We have, in the first place, a series of subjective symptoms already described. The absolute diagnosis is made out by physical exploration. 1. Vaginal touch discovers the os uteri high up under the promontory of the sacrum, and generally pointing backwards; feeling along the roof and anterior wall of the vagina in front of the os uteri, we find this in a state of more or less tension, strained backwards by the retreating cervix. Through this stretched roof we feel the solid mass of the uterus. 2. Now, combining abdominal touch with the vaginal touch, we can grasp the body of the uterus between the hand outside and the finger inside; the fundus is felt through the abdominal wall, above or behind, but mostly above the symphysis; pushing the fundus backwards, we feel the whole uterus move upon the examining finger. 3. By rectal touch, combined with abdominal touch, this is made even clearer, as the finger in the rectum gets more completely behind and above the os uteri, so that the finger on the os and the hand on the fundus measure the whole length of the uterus between. 4. The uterine sound, moderately curved, is passed into the os uteri, whilst the vaginal-portion is depressed by the finger above it, the handle of the instrument then carried backwards, directs the point forwards into the body of the uterus. It will often pass $\frac{1}{4}$, or $\frac{1}{2}$ inch, or more, beyond the normal length, and when it has gone the full length, the vaginal-portion being brought downwards by the instrument, the fundus rises and is felt more distinctly above the symphysis by the hand outside. Pressing upon the fundus, movement is imparted to the whole uterus and sound, which is very perceptible to the hand holding the instrument.

The foregoing methods of examination will also give accurate estimate of the increase of bulk from hyperplasia, and by irregularity of form of the presence of a tumour. The range of mobility of the point of the sound will also give an idea of the enlargement of the cavity of the uterus, and if there is anything inside it.

But since early pregnancy may be the cause of the enlargement and anteversion, it is of primary importance to exclude the probability of this condition before using the sound. If menstruation have been suspended for a month or more; if the os uteri feel soft; if there be the elastic anterior roof stretching (see p. 175) characteristic of pregnancy; if there be the dark-red coloration of the vagina and vulva; if there be present the recognized mammary changes, lay aside the sound.

I have several times known the enlarged anteverted or anteflected uterus projecting over the symphysis mistaken for a tumour. Unless the sound be used it may be difficult to convince a person who has fallen into this error of the true nature of the case. But in practised hands the sound is rarely necessary to make out a satisfactory diagnosis.

In most cases it will be useful, as the first step in physical diagnosis, to empty the bladder.

Treatment of Anteversion.—The indications are threefold: 1. To allay the complications, as congestion, or inflammation of the uterus, which either preceded or arose after the displacement. I place this indication first, because the complications are often the most immediate causes of distress, and because, until they are somewhat relieved, mechanical means to rectify the malposition cannot always be borne. If, then, there be marked increase of bulk, with tenderness of the uterus, it may be desirable to apply four or five leeches to the roof of the vagina, or double that number to the abdomen above the pubes. The patient should keep the recumbent posture, the dorsal being the best adapted to counteract anteversion. Salines and sedatives will be necessary. And some advantage may be derived from tepid vaginal irrigation, and the use of sedative pessaries containing morphia or belladonna.

If the os uteri externum be narrow, we may commonly greatly promote the subsidence of congestion by the bilateral incision of the vaginal-portion. This is not only a very effectual method of local depletion, but the freer opening of the canal, by giving readier exit to menstrual blood and mucous secretions, obviates a great source of future engorgements, and hence of spasmodic attacks.

2. When the first indication has been accomplished, we may proceed to carry out the second and third. The second is to rectify the malposition. The sound is much relied upon by some practitioners. Of course it is immediately effective. But the version quickly returns. The mechanical contrivances designed to maintain the due position are numerous. The first condition to fulfil is, as far as possible, to take off the superincumbent weight of the intestines. In many cases there is a disposition to pendulous abdomen, and hence to swagging of the intestines forwards. This, besides pressing directly upon the posterior wall of the uterus, which looks upwards, involves a sluggish imperfect action of the intestinal canal, with lodgment of fæces and distension with air. Under due support this fault is greatly corrected. This is effected by the adaptation of a good abdominal belt, which supports and strengthens the abdominal wall from its lowest part. In some cases where the enlarged fundus uteri projects sensibly above the symphysis, the lower margin of the belt may be made to seize this part and directly lift it up, thus taking off the pressure from the bladder. To do this the more effectually, a pad may be inserted in the belt. The amount of success to be derived from the belt will depend greatly upon the intelligence and skill of the maker.

The second condition is to support the anteverted fundus from within. The great difficulty in contriving a pessary which will do this, lies in the circumstance that pessaries naturally seek by their upper end to rest in the posterior vaginal *cul-de-sac*, that is, to get behind the cervix uteri, whilst the lower end will rest upon the anterior vaginal wall.

Regarding the uterus as a lever which has to be made to rotate upon its axis of suspension, we have to consider upon which arm of the lever we shall act. We may, for example, push up the longer arm by applying some elevating power to the fundus; or we may draw down the shorter arm by pulling upon the vaginal-portion. Instruments have been devised upon both these principles. Amongst those intended to lift up the fundus may be mentioned the modifications of the air-pessary described by Gillebert d'Héricourt; and a modification of Dr. Roper's described in the Catalogue of Instruments of the Obstetrical Society, which bears in front of the axis of suspension.

The most ingenious contrivance is that of Dr. Graily Hewitt. This, "the cradle-pessary," seems to me the best designed. Fig. 129 gives a general idea of its form. But form and size require careful modification to the particular case. It should not fit tightly, but nursing the uterus, so to speak, it and uterus should move together. The middle arms which support the anterior surface of the uterus vary in length, but as a rule they must be long enough to reach the body of the uterus, that is, to bear on the body end of the uterine lever.

Professor Thomas has also devised an anteversion-pessary. Its basis is a Hodge's lever; but attached to the anterior aspect of this basis is a horse-shoe lever, set at a moderate angle. The curved part of this horse-shoe rises up behind the symphysis pubis, and lifts up the fundus uteri. The size of the instrument requires careful adaptation to the case in hand. I have derived considerable satisfaction from this instrument.

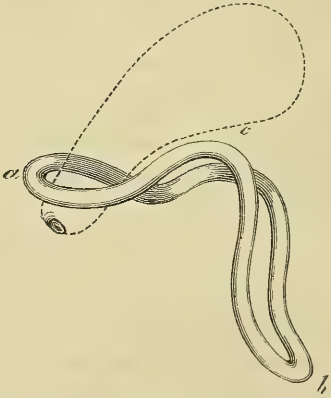

Fig. 129.

TO ILLUSTRATE GRAILY HEWITT'S "CRADLE-PESSARY."

The dotted outline represents the uterus in anteversion. *a.* The posterior arm of the pessary. *b.* The anterior arm which sits behind the symphysis. *c.* The middle rise of the pessary which supports the anterior wall of the body of the uterus.

The anteversion pessaries, even more than those for the relief of retroversion, require careful observation. For the first few days the patient should observe nearly absolute rest. If pain occurs, the instrument should be removed, taking note of the cause of the distress, be it inflammation, improper shape or size of the instrument; and care taken to obviate the cause on readjusting an instrument. During the wearing the patient should lead a life of moderate exertion at best; and submit to examination at least once a month.

I have made the acquaintance of many of the instruments for correcting malpositions through their failure in particular cases. I have been called upon to remove them when they were the causes of distress and even of danger. I feel, however, that it would be wrong to draw from this kind of experience an unqualified adverse opinion. The use of these same instruments may in many other cases have been beneficial; and, naturally, these cases would not be so likely to come under the observation of another physician.

A pessary which compels the wearer to forego exercise, to keep on the sofa, may be pronounced a failure. Under these conditions the health must give way; there can be no improvement in tissue.

Surgery, again, offers resources for the relief of this malposition. It is obvious that if we could so shorten the anterior wall of the vagina at its upper part as to drag upon the cervix, we should bring this part of the uterus downwards and forwards. This may in some cases be accomplished by removing a triangular piece of mucous membrane from the vagina in front of the cervix, and contracting the part by bringing the edges together. The object might also be attained by establishing a cicatrix at this part by potassa cum calce or the actual cautery.

3. Concurrently with the endeavour to correct the malposition, it is desirable to carry out the third indication, namely, to improve the general tone and nutrition. To complete and especially to maintain a cure, we want good muscular fibre and sound tissues. The first condition to obtain these is obviously healthy nutrition, the capacity for converting food into healthy structure. We may aid in correcting this fault by two methods. First, by placing the patient in good hygienic conditions, and the use of tonic medicines, as strychnine, iron, quinine; and, secondly, by local applications to the weak tissues of the vagina and uterus. Some amount of uterine catarrh is almost constant. This is best treated by introducing two or three grains of solid sulphate of zinc into the uterine cavity, or swabbing with tincture of iodine every four or five days. Astringents to the vagina, in the form of injections or pessaries, will lend material help.

Emmet has arrived at some remarkable conclusions (*Gynæcological Trans.*, 1876) as to the etiology of flexions. He distinguishes flexions of the cervix and flexions of the body as a whole. His statistics show that the woman who has been impregnated is rarely found with a flexion of the cervix, and that in comparison with other women, she is but little liable to flexion of the body. Future observation he thinks will settle the point that the existence of a flexion of the cervix should be proof that impregnation had never taken place. Flexions of the body forward are the most frequent. Emmet's observations are extremely interesting, and challenge further examination. I fully recognize the relative frequency of flexions in women who have been pregnant. But I am unable at present to concur unreservedly in his opinion that flexion of the cervix is proof of non-impregnation.

Flexions of the cervix have, says Emmet, their origin at about the age of puberty by the balance being lost between the relative growth of the body and cervix.

ANTEFLEXION.

Version may pass into flexion. The position of the cervix being maintained by its relation to the bladder on the axis of suspension, and the body being moveable and soft, pressure acting upon its hinder surface will gradually bend it down, breaking it as it were at the union of body and cervix.

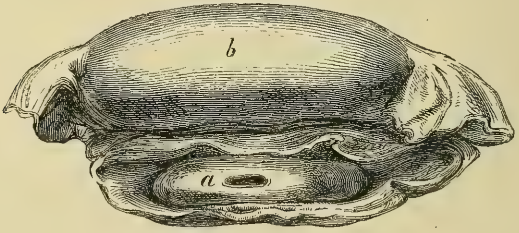

FIG. 130.—(Nat. size, London Hospital Museum.)

EXTREME ANTEFLEXION OF THE UTERUS (R. B.).

a. The os uteri; *b*. the fundus, both looking forward.

The causes of anteflexion are similar to those which lead to anteversion, excepting coitus. To these may be added a state of weakness at the juncture of cervix and body from relaxation, which disposes the organ to bend at this point. It may be congenital or acquired. The congenital anteflexion, being a persistence of the natural condition in an exaggerated form, tends to be corrected with time, and especially by pregnancy, should this take place. But not rarely the bending is much in excess of the normal degree. The organ has quite the form of a retort, the fundus nodding so low that the summit looks down, and is almost on a level with the os. There is commonly some degree of general deficiency of sexual development associated with this condition, more especially a small conical vaginal-portion with a minute os externum, and a short vagina. This form may lead to no trouble until the advent of puberty or marriage. It is difficult to form even a rough estimate of its influence as a cause of dysmenorrhœa or of other disorder, since it is only those cases in which actual disorder arises that come under medical care. There may then possibly exist many cases of extreme anteflexion, unattended by distress. On the other hand, it is certain that in many women who seek relief for menstrual disorder, dyspareunia, sterility, we find marked anteflexion; and I am disposed to infer that anteflexion rarely fails to entail trouble. It is obvious that extreme flexion of the uterus, with a depending fundus, must present a mechanical difficulty to the flow of the menstrual fluid. Hence a degree of retention, causing pain, and engorgement of the organ; and sooner or later hypertrophy of the fundus. Especially in married life these conditions are apt to be followed by metritis. Catarrh and dilatation of the cavity of the body of the uterus are rarely absent. Retrograde ovarian irritation is induced. If under the general engorgement of the ovaries, tubes, and uterus attending a menstrual period, any perturbing cause, as cold, shock, sexual intercourse intervene, the transition into inflammation in the form of metritis, oophoritis, peritonitis, or perimetritis is easy.

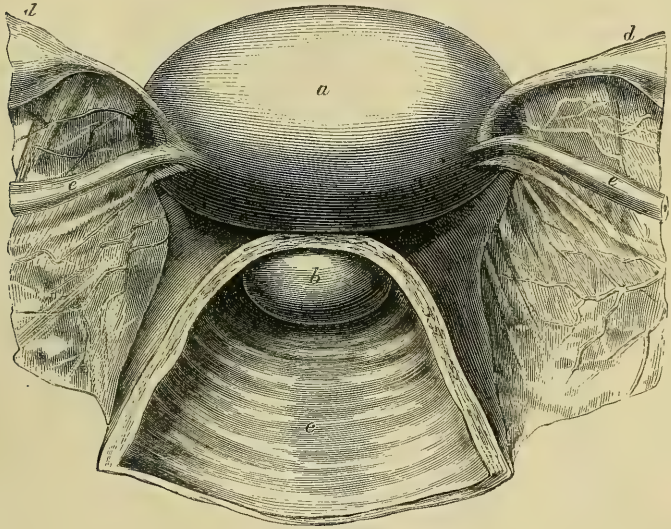

FIG. 131.—(From Boivin and Dugès.)

ANTEFLEXION OF THE UTERUS.

a. The fundus uteri; *b*. the vaginal-portion—both looking forward. *c*. The vagina. *e e*. Fallopian tubes. *d*. *d*. The ovaries.

When relaxation of the uterine tissues and the surrounding structures has taken place, as from general loss of tone, or from local disorder, the fundus may be forced down upon, or behind, the bladder by the superincumbent pressure. This may take place gradually, or suddenly under violent exertion or succussion.

The same features are also well shown in Fig. 131, taken from Boivin and Dugès.

If not existing before the anteflexion, congestion, hyperplasia, hypertrophy, are pretty sure to be developed afterwards, and to aggravate the displacement.

Anteflexion has little tendency to spontaneous cure. Rokitansky says that flexions sometimes tend to pass into versions, that is, the bent-down cervix rises so that the uterus straightens itself. It is intelligible that the uterus which has suffered sudden anteflexion may gradually, under a resilient force, lessen the bend imparted to it. But to do this, the rising cervix must drag upon the cervico-vesical connexions, and either pull up the base of the bladder, or the connective tissue between must stretch. There must, in short, be shifting of the axis of suspension of the uterus. No doubt one or other or both these events take place in primary anteversion, and it is therefore not improbable that they may take place in the secondary anteversion of Rokitansky. But clinical evidence of this change has escaped me. I have known many cases of anteflexion that have lasted as such for lengthened periods.

Anteflexion, like anteversion, produces three sets of symptoms. The first are due to changes in the uterus itself. These cannot be called special to anteflexion. They consist in difficult function, as dysmenorrhœa, in the symptoms proper to congestion, inflammation, and hypertrophy. Hence, menorrhagia and leucorrhœa are very common. But in many cases of congenital anteflexion, menorrhagia does not occur, or at least is not a continuous symptom.

The second set of symptoms are those produced by the relations of the displaced uterus to surrounding organs. Irritation of the bladder, leading to desire to often void it, is frequent.

The third set of symptoms are the remote or constitutional.

Diagnosis of Anteflexion.—All trustworthy means of diagnosis are centred in physical exploration. 1st. Vaginal digital touch feels the os uteri centrally or perhaps anteriorly or posteriorly situated, pointing downwards or a little backwards. Passing the tip of the finger round the vaginal-portion, it feels behind, the elastic roof of the vagina at the angle of reflection from the vaginal-portion, and no solid substance through it; in front between the vaginal-portion and the symphysis pubis it feels the vaginal roof, and through this resting upon it a rounded solid body; on tracing this solid body backwards towards the vaginal-portion, a deep sulcus is felt between them at the point of union. 2nd. The vaginal touch is assisted and corrected by abdominal palpation with the other hand. In this way we may embrace the body of the uterus between the two hands, and movements imparted to it by either hand will be propagated to the other. (See Fig. 132.) 3rd. We may further verify the information gathered by the preceding methods, and extend it, by the sound. This should be curved according to the idea we have formed as to the extent of the flexion, and introduced with the concavity forwards. When the point has reached the os uteri internum, the handle is carried backwards so as to direct the point into the cavity of the body. The passage of the isthmus may often be facilitated by tilting up the

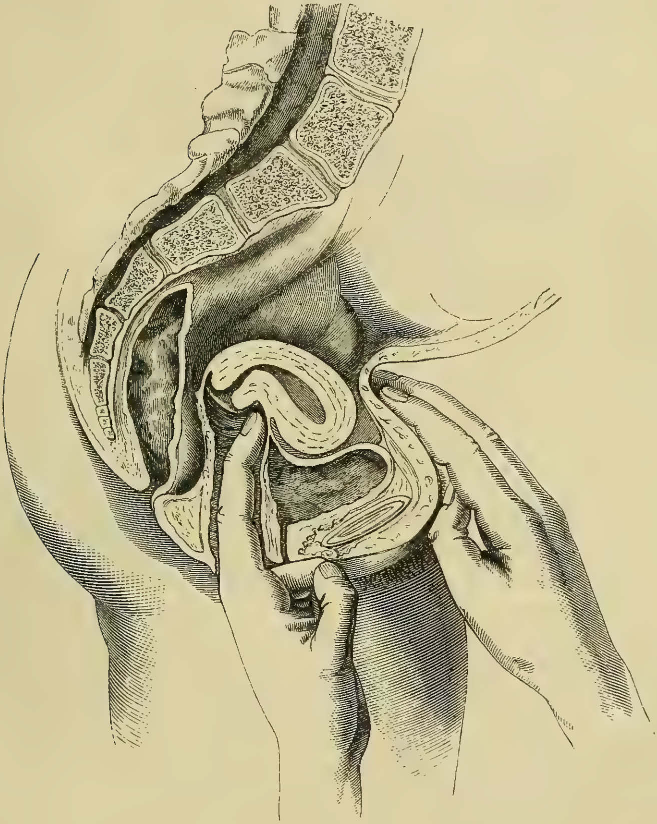

Fig. 132.

SHOWING DIAGNOSIS OF ANTEFLEXION OF UTERUS BY COMBINED ABDOMINO-VAGINAL TOUCH (R. B.).

body of the uterus with the finger so as to straighten the organ. When the point has reached the fundus we have warning by the objective sense of resistance, and by the subjective sense of pain. Then by depressing the handle of the sound, the fundus is further lifted up, so that the hand above the symphysis feels it supported on the sound. This is brought into clearer evidence by giving gentle lateral and elevating movements to the sound, when the uterus carried on it will be felt to move in accordance under the hand. The sound thus passing along the entire length of the mass felt in front of the vaginal-portion, demonstrates that it is the uterus and not a body external to it. It gives further information as to the size, shape, and relations of the uterus. It takes measure of the length of the uterus, it enables us by palpation to distinguish its outline, and by moving the uterus we get some idea of its relations.

The conditions which are most likely to simulate anteflexion of the uterus are: *pregnancy; a fibroid tumour* in the anterior wall of the uterus; *a tumour in the bladder;* or a consolidated *hæmatocele* in the ante-uterine peritoneal pouch, or in the connective tissue between bladder and uterus. These two last conditions might easily pass for anteflexion, if we trusted to the touch alone. Both give the sensation of a solid body separated by a groove or depression from the vaginal-portion; and both may be felt behind and above the symphysis pubis. The sound will usually make matters clear. If the mass be a fibroid, the sound will not pass into it in the direction of its axis; it will probably run up in a straighter direction, more in the axis of the pelvic brim behind the tumour, when we shall realize the existence of a thicker mass between the sound and the finger in the vagina, or the finger above the pubes; we shall make out the increased bulk and weight of the body; we shall, perhaps, ascertain that the shape is not uniform like that of the uterus, but bulging more on one side; the mass will be harder than the uterine wall; and in some cases the sound will only pass in a tortuous course.

The tumour in the bladder may be distinguished by fixing the uterus on the sound, when the tumour can be made to move or glide independently.

The ante-uterine hæmatocele may be distinguished by a similar course of analysis; the mass is felt to be distinct from the uterus which is moved apart upon the sound. The history, also, may help. But pelvic diseases present no exception to the general fallacy of history, so that I am accustomed to rely upon no diagnosis which cannot be reasonably based upon clinical objective signs.

The Treatment of Anteflexion.—The rectification of the anteflected uterus is more difficult than that of the anteverted one. We can get no power upon the cervical arm of the lever which will have much effect in lifting up the fundus. We have to rely mainly upon propping up the fundus from below; upon taking off the superincumbent weight; upon straightening the cervix by inserting a more or less rigid internal rod—a doubtful remedy; and upon diminishing the unnatural weight of the body of the uterus. This last object it should be our endeavour to attain first, inasmuch as it may depend upon congestion and inflammation, and this state may forbid the immediate application of mechanical means. A few leeches to the roof of the vagina in front of the os uteri may be useful if there is obvious fulness, with pain and increased heat of the part; emollient injections will help. During this preliminary treatment rest in the recumbent posture must be enjoined.

If the patient be very stout, with flaccid abdominal walls, a good belt will aid in diminishing the pressure upon the bowed-down uterus. Keeping the bowels open by suitable aperients, and the large intestine clear by an occasional enema, must on no account be omitted.

The uterus may be propped up from below by one of Thomas's or Hewitt's pessaries. But the effect of pressure so applied to the fundal arm of the uterine lever will sometimes be to cause the uterus to revolve upon its axis of suspension, the cervix retaining its flexion, and the os coming forwards.

To straighten the cervix there are two adjuvants. First, we may pass an intra-uterine pessary. If this can be borne, it may be sufficient of itself, or if not, it will convert the uterus into so good a lever that the external pessary will act efficiently. The best internal pessary for this purpose is Wright's, made of vulcanite. Its expanding branches, diverging when *in sitû*, tend to lift up the fundus; or my galvanic coil pessary sometimes answers well.

The axis of the cervix may also be brought into coincidence with that of the body of the uterus by inserting a laminaria tent. The dilatation of the entire uterine canal thus effected will not, indeed, be permanent, but it may be a step by which other means may be utilized. It is also serviceable by giving free vent for any fluids that may have accumulated in the cavity of the uterus. I do not, however, advise the use of tents as a general rule. They are not free from objection on the score of inflammatory complications and pyæmia. Free access to the uterine cavity being obtained, we may reduce the bulk of the uterine body, and induce a healthier mucous membrane, by swabbing with tincture of iodine.

In a considerable proportion of cases, some straightening may be obtained by the bilateral division of the vaginal-portion. Or, as Sims has shown, we may obtain a straighter canal by dividing the vaginal-portion through the posterior lip.

Occasional passage of the uterine sound will be useful not only to verify the condition from time to time, but also to straighten the uterus and lift the fundus out of its unnatural depression.

If the displacement be associated with weak fibre, it is only by slow degrees that the uterus acquires the power of preserving its proper form and position. Some months, perhaps many, will be required for a cure; and we must ever be prepared for disappointment. Tolerance or accommodation may, however, come with time, and when the periodical congestion of ovulation has ceased, the troubles of anteflexion may subside.

The cure will be even more protracted if there is any marked degree of atrophy or thinning at the angle of the flexion. In this case new growth must take place. In proportion as this process goes on, the inferior or anterior wall gets strengthened, as we may imagine it would if we could apply a splint to its length. I believe that in some cases in which the patient has not reached the climacteric, this does take place when the uterus is maintained in a straightened condition by mechanical supports. And I also believe that atrophy at this point is not a necessary condition of flexion.

RETROVERSION; RETROFLEXION.

Retroversion simple is, I believe, not common in the unmarried. Nor is it very common in the married who have not had children. It occurs most frequently as a condition of prolapsus, under which head it has been described. It is not nearly so frequent as retroflexion. This may, perhaps, be partly accounted for by the tendency which the uterus has to bend at the junction of neck and body when force is applied to the fundus. Thus, when the fundus is once inclined a little backwards, as in the early stage of retroversion, receiving the superincumbent weight more and more upon its anterior surface, it rolls back, whilst the cervix, being held down on its axis of suspension, maintains its position.

The history of retroversion and retroflexion of the gravid womb I have drawn with some fulness in my work on *Obstetric Operations,* and do not therefore discuss it here.

The course and effects of retroversion do not require lengthened description, since a great part of the history of retroversion belongs properly to that of prolapsus. The healthy uterus is not very liable to retroversion. This displacement is usually secondary upon engorgement, enlargement of the body of the uterus, upon atrophy or upon the presence of a tumour. I have also known it to be produced by the residual adhesions of a retro-uterine hæmatocele. If the uterine body be a little enlarged from any cause, as during menstruation, sudden exertion or succussion may throw it back, more or less descent attending. This may be distinguished as *acute retroversion.* As in acute prolapsus, there will be, first, the pain produced by the violence done to the uterine supports. This will last for several days, or even weeks. Pelvic peritonitis may even be provoked. In the next place, and often very quickly, irritation of the bladder and rectum ensues, and there may even be retention of urine, and of fæces, and tenesmus. Then the obstruction caused by the altered relations of the parts to the circulation of the uterus, leads to increased engorgement of the organ, especially of its body. The uterus itself becomes the seat of pain of a throbbing character, with a sense of heat, local oppression, and bearing-down. This tenderness is also productive of dyspareunia. The pain radiates to the sacral and lumbar regions, to the groins and down the thighs, generally down one leg more than the other. There is often a considerable amount of constitutional disturbance evinced by accelerated pulse, and by nervous phenomena, as hysteria. If the uterus be much depressed, "expulsive pains" may be excited, and sometimes sacral pain—coccygodynia is produced.

When retroversion is produced gradually, it is most commonly preceded by some morbid alteration in the substance of the uterus; and the symptoms proper to the complicating disease will be added to those due to the displacement, but the local symptoms will be less acute.

That retroversion is a condition of prolapsus is especially true of what may be called the *senile retroversion.* In this case it is not necessary that there should be any antecedent disease of the uterus. The essential preliminary condition is atrophy. The uterus has shrunken below its normal dimensions; the absorption of the fat which makes up the padding of the pelvis, and the loss of tonicity of the tissues generally, facilitate prolapsus. As the uterus falls, its fundus rolls back, so that when prolapsus has passed into procidentia, the bag formed by the inverted vagina contains the uterus completely retroverted, where it may be grasped and surrounded by the fingers.

This position of the uterus may also be found in young women as the result of prolapsus after labour, the posterior wall of the vagina being weakened perhaps by perineal laceration.

Retroversion may, as Rokitansky says, be promoted by a very small inclination of the pelvis. That is, if we suppose the axis of the pelvis to approach the brute type, the axis of the brim being parallel with the vertebral column, the pressure of the superincumbent intestines will take the fundus uteri in front, and thus throw it over backwards. In the stooping or kneeling posture the inclination of the pelvis is much lessened. Hence the distress often felt in this posture.

The Diagnosis of Retroversion.—Physical exploration reveals the exact condition. The patient is placed in the semi-prone posture. Vaginal touch shows the os uteri tilted forwards behind the symphysis pubis ; the vaginal roof behind the vaginal-portion is put on the stretch, forming an inclined plane, tending downwards and backwards, thus reversing the normal direction of the vaginal canal. Through this stretched vaginal roof, the cervix and body of the uterus are felt extending in a line with the vaginal-portion, as a solid rounded mass, which makes the posterior wall of the vagina protrude forwards, compressing it against the anterior wall and the bladder. Often, however, the uterus takes an oblique direction ; its long axis being not quite coincident with the conjugate diameter of the pelvis. This is why the bladder and rectum so often escape disturbing pressure. Pressure upon the uterus in recent cases will generally evoke acute pain, and in chronic cases some degree of tenderness on touch is rarely absent. There is commonly a free secretion of mucus, the exponent of the local congestion.

The position is made still clearer by rectal touch. The finger in the rectum easily makes out the enlarged rounded fundus of the uterus projecting into the rectal cavity. It lies in Douglas's pouch. The tip of the finger can in most cases without difficulty travel all round the circumference of the uterine mass, getting above it, whilst at the same time, by abdominal touch, we endeavour to make the two examining hands meet, we place the whole mass whose nature we are seeking to identify between them ; and thus, having brought it, isolated from the abdominal cavity into a limited space, we can define its outline and relations, and determine accurately its nature.

The last and most conclusive evidence is obtained by the sound. The patient lying on her left side, the examiner feels for the os uteri, and guides the point of the sound, which is very gently curved, into it with the concavity turned backwards ; when it has run about an inch, it will generally be found to pass more easily by lifting up the fundus of the uterus with the guiding finger, whilst the point of the sound is directed backwards ; by this consentaneous manœuvre the sound will penetrate to the fundus, of which intimation is obtained by the arrest of the instrument, by the sense of pain which almost invariably attends touching the fundus, and by the length to which the sound has penetrated—that is, two and a half inches or more.

The final evidence is obtained by what may be called the crucial test of replacing the uterus. The handle of the sound is made to describe a large radius by raising the handle whilst the finger on the body of the uterus, carries this part over to the left, then by the gentlest possible movement, the point is made to turn in the uterus with the smallest possible radius, until its concavity looks forwards; then the handle is gently carried backwards in a straight line, or if the uterus is sensibly enlarged, a little obliquely backwards, so as to lift it on one side of the projecting promontory of the sacrum. The uterus, thus forming a common lever with the sound inside it, has its fundus brought forwards towards the pubes, where it may now be felt through the abdominal walls, the region hitherto occupied by the solid rounded mass being left void (see Figs. 138, 141).

Demonstration cannot be more complete. The patient is usually conscious of immediate relief.

The conditions that may lead astray are—1. *A tumour in the posterior wall of the uterus.* This may be distinguished by the sound passing well in front of the mass behind the vaginal-portion along the natural direction of the uterine cavity, or even more anteriorly, and especially by our being enabled to feel the fundus uteri supported on the sound above the pubes. 2. A *retro-uterine hæmatocele.* This is distinguished from retroversion by the same means; we make out the uterus well in front of the tumour; and usually the os points downwards or backwards, and the whole uterus is pushed forwards upon the symphysis. 3. A *small ovarian tumour* in Douglas's pouch. This is distinguished by the same means. 4. A mass of *hardened scybala* in the rectum. Such a mass, coming down to a level or nearly, with the cervix uteri, is at times very deceptive. It may be distinguished by its yielding under the pressure of the finger; and subsequently by the sound showing the fundus uteri to be in a different place.

But, in fact, there can be no ambiguity or doubt, if we carry out the diagnostic manœuvres above described. The shifting of the firm rounded mass felt behind the vaginal-portion to a position in front by the sound, so that it is felt above the symphysis, is characteristic, and conclusive of retroversion.

We must, however, bear in mind that the fundus of the uterus may be tied down by adhesions, so that it becomes unsafe to attempt to lift it up by the sound. The occasional occurrence of this complication dictates great care and gentleness in reversing the point of the sound. The handle should be carried back with the minimum of force, pressure by the finger on the fundus aiding, the lightest touch only should be added to help its gravity. If any resistance be experienced, the attempt at reduction must be abandoned.

The *treatment* of retroversion consists mainly in keeping the uterus in its normal position by mechanical support until its natural supports have recovered the power of doing their work. In some cases it is necessary to begin by removing or lessening local congestion or inflammation. This is done by rest, by the application of leeches, but this is not often necessary; by sedative pessaries; by the use of poultices or warm water irrigations if the pain is great; by saline and sedative medicines. The mechanical treatment consists in the use of the sound and pessaries. The sound already used for diagnostic purposes is now applied to treatment. If by its means the uterus be replaced just before a menstrual period, and the patient be kept at rest, it is possible that the proper position may be maintained throughout the period. Should this happen, the period will pass off more easily, and a step will be gained towards cure. The uterus will escape an increment of excessive congestion; and it may soon be able to bear the contact of a pessary. The best form of

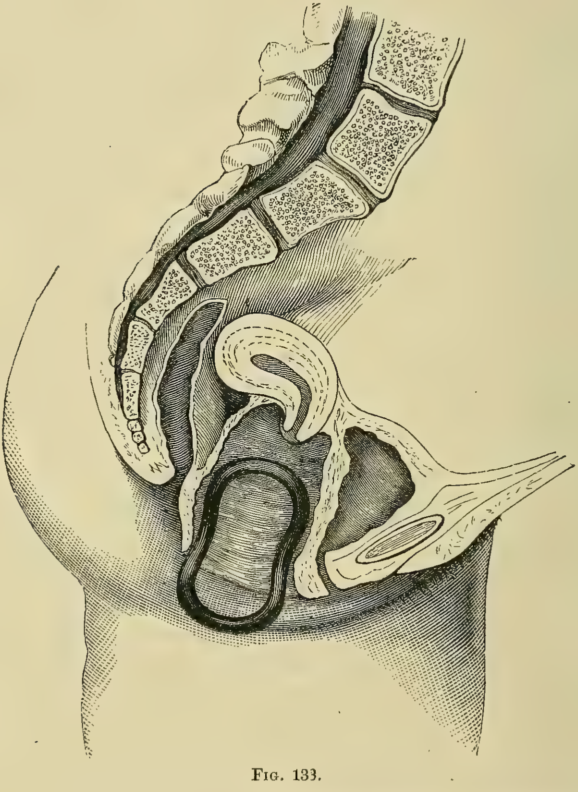

Fig. 133.

ILLUSTRATING THE MODE OF APPLYING THE HODGE OR LEVER-PESSARY FOR RETROVERSION OR RETROFLEXION (R. B.).

The diagram represents the first stage of introduction. The pessary is passed edgewise in the line of the vulvar fissure. During its passage the perineum is held back by the finger, and the pessary is pressed backwards so as to avoid the symphysis.

pessary is one of Hodge's. The size is selected according to the capacity of the vagina, bearing in mind the rule that it must not be so large as to stretch the canal. Its upper limb must rise to fill the *cul-de-sac* behind the vaginal-portion, whilst the lower limb rests upon the anterior wall of the vagina, not descending below the middle of the symphysis pubis. Immediately before applying the pessary it is desirable to restore the uterus by the sound or finger. One great test of the fitness of the pessary consists in its being borne without pain. If it cause pain, it must without hesitation be withdrawn, and, guided by the information obtained by the failure, we select another pessary.

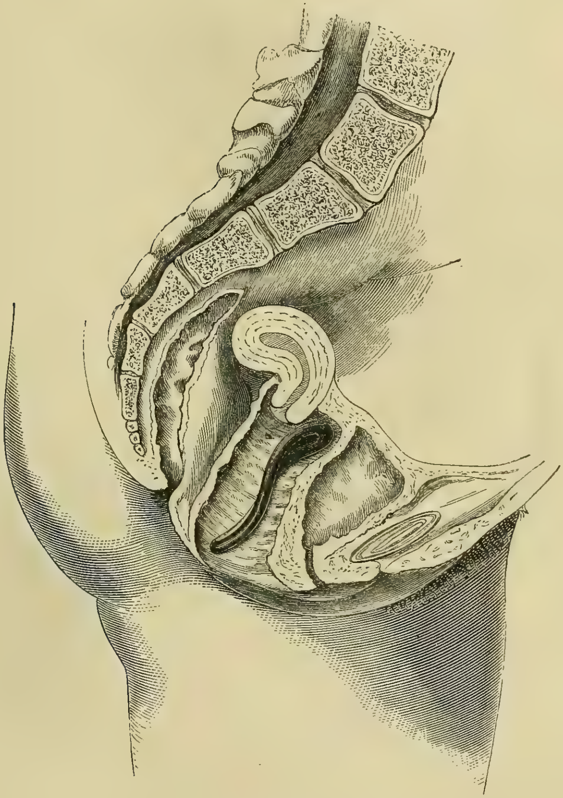

Fig. 134.

THE SECOND STAGE IN THE APPLICATION OF THE HODGE-PESSARY (R. B.).

The pessary has been turned in the transverse diameter of the pelvis after clearing the vulva. The upper limb runs up in front of the cervix uteri.

If the pessary fits well, the patient needs no longer to be confined to the recumbent posture. It is not the least of the many useful points of this admirable instrument, that its beneficial action is even promoted by moderate exercise. In the upright posture the inspiratory effort carries down the anterior wall of the vagina, and with this the lower limb of the lever; the upper limb rises and comes forward, gently pushing the body of the uterus before it; the long axis of the lever under these circumstances oscillates lightly a little on either side of the vertical line; every movement, every respiration, carrying the fundus of the uterus towards its natural inclination.

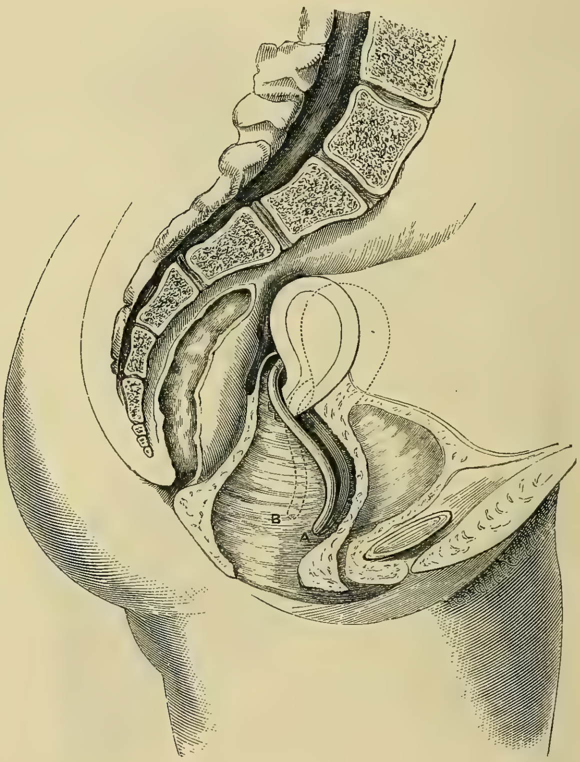

Fig. 135.

SHOWING THE THIRD AND FINAL STAGE OF THE APPLICATION OF THE HODGE-PESSARY (R. B.).

The upper limb has been carried by the finger behind the cervix; the lower limb lies behind the symphysis pubis. A shows the ordinary position of the pessary during expiration; the dotted pessary B shows the retreat of the lower limb during inspiration.

Gradually, under the influence of this support, the tumefaction of the body of the uterus diminishes, and with it the tendency to fall over backwards; the vagina and other supports, relieved of undue strain, recover their tone; and, by-and-bye, the pessary can be dispensed with.

This is the essential principle of treatment; but certain accessory means are often useful. Morbid complications, local or general, must be dealt with according to their indications. Since not uncommonly there exist some engorgement with abrasion of the vaginal-portion, and catarrh of the cervico-uterine cavity, an occasional touch of nitrate of silver or the introduction of a small stick of sulphate of zinc, or painting with tincture of iodine, will much accelerate the cure. Astringent vaginal injections will also be useful.

An important point is to obviate constipation and accumulation of fæces.

When adhesions bind down the retroverted body of the uterus, the use of the sound to rectify the malposition must be omitted. But the lever-pessary will still be useful. It will sometimes be necessary to use in the first instance a smaller pessary. The adhesions will generally slowly stretch under the continuous gradual action of the lever; and under this gradual elongation the adhesions disappear by atrophy. Pregnancy will sometimes in like manner stretch and induce atrophy of the adhesions. If not, by hindering the development of the uterus, they may cause abortion.

Probably few cases of retroversion uncomplicated by tumours in the walls of the uterus, or not caused by the pressure of tumours outside, would long resist treatment, if we could exclude counteracting accidents. But it is difficult to command all the conditions of success: especially the securing functional rest of the organs affected, the postponement of pregnancy, the avoidance of excessive bodily exercise, and other disturbing causes.

Retroflexion consists in an arching of the uterus backwards. We distinguish two forms: the primary, or congenital: and the secondary, or acquired. The *primary* cases may be often discovered in the early years of menstrual life. They are found in the virginal state. The rational clinical inference is that the flexion existed during childhood. During this period, the uterus, having no functional existence, lies small, undeveloped, passive, and gives rise to no subjective symptoms. But when the organ becomes subject to the periodical hyperæmia of menstruation, the obstacle set by this malformation gives rise to dysmenorrhœa. And the body of the uterus being enlarged by the development incident to its entry upon functional activity, and also abnormally by the congestions to which it is exposed, and the impediment offered to its circulation, becomes the source of other troubles which cannot be overlooked.

Still, although something beyond the normal degree of enlargement generally takes place after the onset of menstrual life, this primary form of retroflexion is rarely marked by such considerable enlargements of the body of the uterus as are commonly observed in the acquired forms which ensue upon child-bed.

When women having a retroflected uterus marry, their suffering commonly becomes aggravated. A new source of congestion is added to the menstrual flux; the organ fails to get the intervals of rest it needs; a state of persistent hyperæmia is induced, which borders on inflammation; this easily leads to hyperplasia, and hence to hypertrophy of the body of the uterus. Its functions are performed with increasing difficulty. The dysmenorrhœa is more severe; menorrhagia is not uncommon; and dyspareunia is almost constant. This last effect often entails another—sterility. But sterility in association with retroflexion is more commonly due to the frequent complication with a narrow os externum. This complication also aggravates the other evils, especially the dysmenorrhœa.

The *secondary or acquired form of retroflexion* most commonly arises after childbirth or abortion. Labours attended by exhausting conditions, as hæmorrhage, dispose especially to this displacement. The retroflexion often takes place within a few days of labour. At this time its tissues are soft, flabby, pliable; the bulk of the uterus, especially of its body, is greatly above the normal size; its weight is greater; and as the increased weight is put upon a larger body, that is, upon a longer lever, it easily falls over, bending at the junction of body and neck, below which point the neck is fixed and supported by its attachment to the bladder. In some cases there is a predisposition to retroflexion from this condition having existed before the pregnancy. But in many cases it takes place where no predisposing cause can be traced. It is produced by pressure acting upon the enlarged heavy flaccid uterus. If undue pressure is exerted within the first few days after labour, before the uterine walls have undergone marked shrinking and have recovered a fair degree of firmness from contraction and involution, retroversion or retroflexion is almost sure to follow. If involution have advanced a little, so that the bulk of the uterus is sensibly diminished and the rigidity of its walls is increased, prolapsus is more likely to occur than flexion. I have said that flooding disposes to retroflexion by weakening tissue. It does so in still another way. A little blood or a clot is often retained in the uterine cavity; this keeps up excessive bulk of the organ, and retards involution; the expulsive efforts excited by the presence of clots bring the pressure of the abdominal muscles to bear upon the body of the uterus, and this is rolled over. This bearing of expulsive action upon the anterior surface of the uterine body is further promoted by the squatting of the uterus in the lax vagina, a condition of prolapsus which already implies a minor degree of retroversion. Retroflexion, in its turn, keeps up secondary puerperal hæmorrhage, and thus each evil aggravates the other.

Professor Martin's explanation of the influence of defective involution of the placental site already cited (see p. 683), applies to retroflexion. Defective involution of the anterior wall leads to retroflexion.

Flexions are also caused by tumours in the fundus uteri, by pressure of tumours external to it—as ovarian, by pseudo-membranous adhesions.

Retroflexion may long persist as simple bending or arching; but gradually, although seldom, it proceeds to angulation, assuming the form of a retort.

The angulation occurs at the point of extreme arching, and this corresponds more or less closely to the os internum uteri. Occasionally it occurs in the cervix itself, about the middle, between the os internum and os externum.

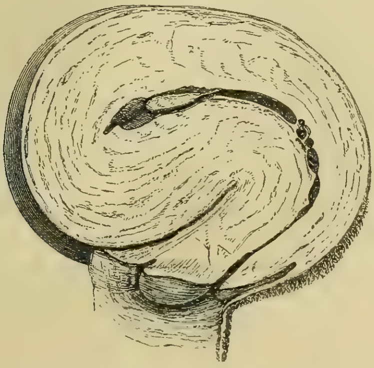

FIG. 136.—(From Nature, from a specimen in Middlesex Hospital Museum.)

EXTREME RETROFLEXION OF THE UTERUS (R. B.).

A section is made through the centre, showing atresia in places of the canal of the uterus.

Sometimes, says Rokitansky, retroflexion passes into retroversion. The cervix follows the bending back of the body, whilst it is drawn upwards. In moderate retroflexions, there is observed an inclination of the vaginal-portion forwards and upwards, so that the anterior lip seems flattened; and as the flexion increased, the duplicature which constitutes it vanishes. I do not know how far this description is drawn from clinical observations on the living. I am not myself in a position to affirm its accuracy. Sometimes the bending is so great that the fundus comes down to the level of the os, as in Fig. 136. (This preparation is, I think, erroneously described as an anteflexion in the catalogue). It also demonstrates a very important point in the pathology of retroflexion. It shows that atrophy, or wasting of tissue at the seat of flexion, is not a necessary condition. In this preparation the inferior wall is everywhere as thick as in the natural state. I am convinced that this is very frequently, if not, indeed, most commonly, the case. Clinical observation satisfies me that on rectification of the position by the sound or a Hodge's pessary, the walls of the uterus commonly present their normal thickness.

Still another point in the history of retroflexion is exhibited in this preparation. It shows that the walls of the uterine canal have grown together, producing atresia in the neighbourhood of the os uteri internum.

Rokitansky and Virchow both describe this atrophy and narrowing at the point of extreme flexion, but interpret it differently. Rokitansky says the mucous membrane of the cervix is normally thick and strong, becoming gradually thinner towards the body of the uterus. The seat of inflexion, he says, is always the neighbourhood of the internal os. He finds the connective tissue at this spot thinner and looser, and says this is the result of catarrh of the uterus after labour. Virchow points out that the whole cervix, excepting the portio-vaginalis, is united by connective tissue to surrounding parts, especially to the hinder and under surface of the bladder. The cervix thus fixed, inflexions are produced by inflammatory adhesions dragging upon the body of the uterus. Thus, Rokitansky thinks the atrophy of the internal orifice is primary; Virchow thinks it secondary. Clinical observation proves that in the majority of instances, at any rate, there are no adhesions. The fundus can generally be lifted up to its normal position. Again, the frequency of cure under the use of Hodge's pessary proves the same thing. Nor can it be admitted that Rokitansky's theory is more than occasionally true. Retroflexion is undoubtedly frequently first observed to follow labour immediately, that is, before uterine catarrh can have set in. The mechanism in these cases is simply this: the heavy fundus, being in a flaccid state, falls back, partly by its gravity, partly by being forced down under the pressure of the intestines. In such cases, involution becoming impeded, catarrh will almost always ensue, and from long-continued angulation, the tissues at the seat of flexion will undergo some amount of atrophy. It is this altered state of the tissues of the cervix, combined with the increased weight and bulk of the fundus, that makes restoration to the normal position so difficult and tedious in some cases.

Retroflexion is far more frequent than retroversion, that is, than retroversion independent of prolapsus. Pathological deductions drawn from statistics are exposed to such numerous fallacies which no sacrifice of time and toil can obviate, that I do not attempt to give any numerical estimate of the frequency of the occurrence of retroflexion. It is enough to say that, in any given large number of women complaining of pelvic distress, a considerable proportion will be found to have retroflexion. It is a frequent cause of dysmenorrhœa, menorrhagia, uterine hæmorrhage, leucorrhœa, abortion; and this is not a contradiction of sterility. It produces also distress by pressure on surrounding parts. The mass consisting of the enlarged bent-back uterus protrudes into the cavity of the rectum, and obstructs it like a ball-valve. The stools become flattened or ribbon-like. It is true the cases are rare in which anything like absolute closure of the rectum by approximation of its walls occurs. But a close degree of occlusion is not necessary to cause great disturbance of the function of the rectum. The effect of a foreign body constantly protruding into the intestine is something more than is accounted for by mere contraction of its calibre. The constant irritation disturbs or perverts the normal action of the muscular coat. The pain felt in defæcation induces the sufferer to postpone the execution of this necessary act; hence there arise gradual accumulation of fæces, and a habit of constipation; these in time induce permanent distension of the canal, and a loss of peristaltic power, which may fairly be considered as a degree of intestinal paralysis. If defæcation produce these results, a retrograde obstruction and disturbance of the whole digestive functions is sure to follow. Retention of the residue of the food in the large intestines leads to decomposition; hence flatulence and absorption of some of the elements of this decomposition. The effect of this form of blood-poisoning, to which the term "copræmia" may not improperly be applied, is seen in the sallow, dirty hue of the skin, and the unpleasant exhalations from it. Ascending the course of the alimentary canal, the difficulty presented below leads to difficult and imperfect performance of the functions of the small intestine and stomach; hence fermentation, flatulence, pyrosis, nausea, and the various phenomena grouped under dyspepsia. The liver will hardly escape, especially when, as is frequently the case in women of extreme nervous susceptibility, vomiting is induced. Imperfect digestion has for its inevitable consequence imperfect nutrition and disordered secretions. And thus it happens that in time no organ is left unimpaired, no function is healthily performed.

The nervous system, often so susceptible in women, will exhibit the most marked aberrations. The nervous centres respond to the slightest impressions. Hysteria breaks out in all its manifold eccentricities; neuralgia appears in one or more of its various forms, as sciatica, lumbago, tic douloureux, rheumatism; headache and a disposition to vertigo or syncope frequently recur; emotional, moral and intellectual disturbance, as manifested in irritability, despondency, melancholy, loss of command over feeling and thought are often developed. Many of these phenomena may be thus traced to bad nutrition; but there is good reason to believe that some, especially the nervous phenomena, are more directly induced, or are at any rate aggravated by the influence of the displaced uterus upon the nervous centres. The congested displaced organ is a constant source of nervous irritation and exhaustion; it is constantly pressing upon the sacral plexus; it is constantly sending painful impressions to the nervous centres; constantly using up in a morbid direction the nerve-force which is wanted for the performance of healthy function.

A not uncommon form of nervous disorder induced by retroflexion is severe, almost persistent pain in the lower part of the spine; sometimes most intense in one fixed spot, where it is easy to evoke the sense of tenderness on pressure. Many such cases have been treated as sufferers from spinal disease, and have been confined to the couch wearing various spinal instruments for months and years, under the erroneous belief that the spinal suffering was primary and essential; its mere symptomatic character not being suspected. With or without this marked spinal pain, a sense of numbness, of want of power, especially of inability to walk, are often complained of, and tend to confirm the belief in spinal disease. Brown-Séquard distinctly traced paraplegia to a retroflected uterus.

I can well imagine the surprise which the attribution of these formidable consequences to retroflexion of the womb will excite in the minds of those physicians who are ignorant of the pathology of the pelvic organs. Such, they will perhaps exclaim, are the extravagances of specialists. Yet, I would ask, is not the sequence of events as narrated quite in harmony with sound physiology and pathology? I am very sure they are in harmony with accurate clinical observation. If this be doubted by those who are ignorant of gynæcology, may it not be because they have thought it possible to study successfully disease in women, whilst omitting to take note of the diseases of those organs which make her what she is?

The test of treatment confirms the conclusion drawn from diagnostic exploration. In the great majority of cases the evils enumerated as found in association with retroflexion are relieved and finally removed when the retroflexion and its local consequences are cured.

The persistence of flexion induces certain changes in the uterus. Obstruction to its circulation brings congestion; this leads to hyperplasia and hypertrophy of its walls, especially of the body, the vaginal-portion often partaking only slightly in this change. The obstruction to the escape of menstrual and mucous secretions from the cavity of the uterus increases the congestion and leads to increased secretion; these being retained, uterine contractions are excited to expel them; the os internum being more or less closed, the uterus contracting as a sphere upon its contents, these tend to escape equally in all directions, and hence pressure is brought to bear upon the openings of the Fallopian tubes as well as upon the os internum. There is then, in proportion to the extent of the obstacle opposed in the os internum, dilating force applied to the mouths of the tubes; these gradually yield, and a retrograde dilatation of the tubes sometimes will follow. The dilatation of the cavity of the retroflected uterus is always attended by some amount of chronic inflammation of the mucous membrane or catarrh. Perhaps the term inflammation is ill-chosen; the condition is rather one of constant engorgement leading to rapid shedding of epithelium and mucous secretion; it is analogous to chronic catarrh of the lungs. The occasional retention of mucus in the uterus sets up colic. A certain quantity of mucus must accumulate before the uterus becomes so distended as to excite it to contract; this quantity in many women is remarkably definite, taking in some a week, in others a fortnight to collect. Why the expulsive colic simulating dysmenorrhœa occurs midway between two periods is simply because the uterus being emptied at the menstrual epoch, the secretions begin to gather again from that time. Not seldom a little blood is mixed with the mucus. This is not to be interpreted as the result of ovulation, but is simply hæmorrhagic, the product of engorgement. It is a common history to hear from women suffering from uterine obstruction that they have periodical gatherings like an abscess in the womb attended by severe colic and expulsive pains which are relieved by the "bursting" and escape of a quantity of discharge. These cases are of the kind above described, although they may not exhibit equally regular periodicity.

Serious dangers attend retroflexion from the persistence of this condition after conception has taken place. The unfavourable shape of the uterus, and its retention in the pelvis, oppose the due development of the organ. Hence frequently abortion ensues; and when this does not happen, there is the more formidable danger arising from the locking of the enlarged uterus in the pelvis about the third or fourth month. The history of this accident is fully described in my *Obstetric Operations.* These probable events strongly enforce the expediency of curing retroflexion.

The flexions found in *advanced life* may be the persistent flexions from an earlier age. But some undoubtedly take their origin after the climacteric period. The body of the uterus, which has failed to undergo the normal senile retrogression or atrophy is pulpy, traversed by degenerating vessels, it is softer and thinner; its cavity is dilated, filled with catarrhal secretion;

its cervix is beset in its connective-tissue substratum with Nabothian vesicles, and often from the persistent production of these bodies it is atrophied and degenerated to a mere framework from their dehiscence in the tissue. This condition is principally found at the seat of the os internum; indeed, here it has often proceeded to a scar-like retraction of the atrophied connective tissue, amounting to atresia. This is seen in Fig. 136. At this spot the uterine body sometimes bends in the shape of a fracture; it may be backwards or forwards.

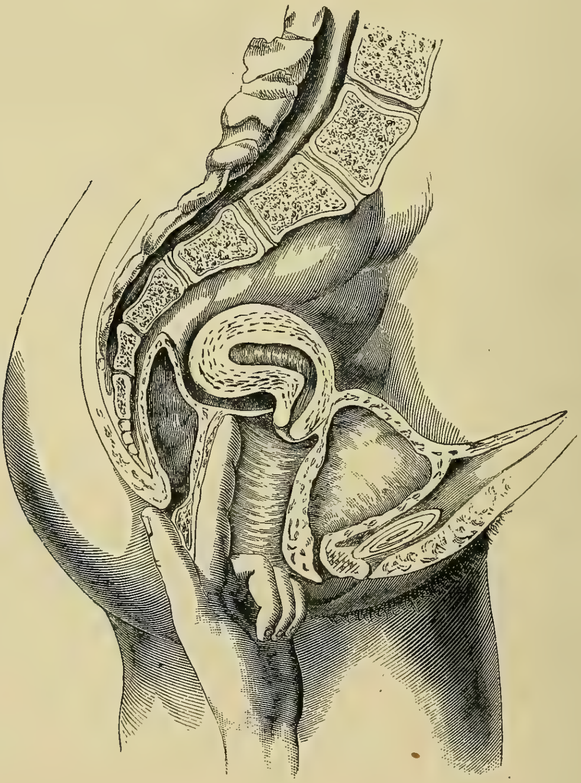

FIG. 137.

ILLUSTRATING THE DIAGNOSIS OF RETROFLEXION BY THE VAGINAL TOUCH (R. B).

The *diagnosis of retroflexion* differs in some degree from that of retroversion. The os uteri, instead of pointing forwards near the symphysis pubis, points more or less downwards, and may be near the middle of the pelvic cavity. When the body is much enlarged, however, the vaginal-portion is pushed forwards, so that the os points downwards near the symphysis.

The position and direction of the os uteri being determined, the exploring finger feels in front of the vaginal-portion seeking to trace the cervix and body of the uterus forwards through the anterior roof of the vagina, the normal seat of the organ. Instead of feeling it here, the finger misses the resistance of solidity, and by combining abdominal palpation, the two hands may be brought to approach each other, when the absence of the uterus from its natural place is determined. The exploring finger next feels on either side, and determines the condition of this part of the roof of the vagina. It is then carried behind the vaginal-portion and feels a firm globular uniform mass through

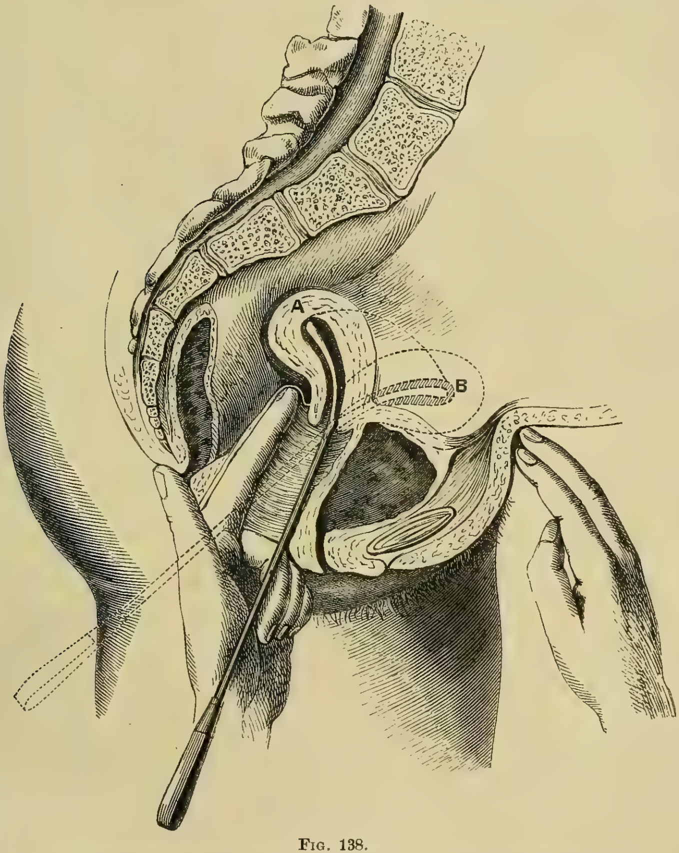

Fig. 138.

DIAGNOSIS AND REPOSITION OF THE RETROFLECTED UTERUS BY THE SOUND (R. B.).

A. The uterus in retroflexion, the sound in its cavity. B. The uterus brought forward by reversing the sound. The fundus can now be felt by fingers pressing in the abdominal wall above the symphysis.

the posterior wall of the vagina. Tracing this on to the vaginal-portion, the tip of the finger sinks into a groove between the two. It is generally possible to determine the continuity of these two parts. This is best done by keeping the finger behind the vaginal-portion so as to feel the body of the uterus, then to combine the abdominal touch so as to embrace the cervix between the two hands. Movement imparted by one to the body between will be felt by the other.

This is made clearer still by the rectal touch. The finger in the rectum will travel round the outline of the post-cervical tumour to a greater extent than can the finger in the vagina. The abdominal touch combined with the rectal also affords more positive evidence than the abdomino-vaginal touch.

The *experimentum crucis*, however, is performed with the sound. Before passing it the probability of pregnancy must be carefully weighed. In the great majority of single persons, and of those who have lived a married life for several years without having children, the probability is strongly in the negative. The presumption is also in the negative in those who, having had children, seek relief from the consequences of retroflexion. Amongst these consequences frequently is acquired sterility. Two things help in forming an opinion: the date of the last menstruation, and the bulk of the uterus. If the bulk be sensibly increased, and a period have been missed, of course the sound should not be used. It should not, however, be forgotten that increased bulk of the uterus is an almost constant attendant upon retroflexion. To pass the sound a curve is given to it corresponding to the idea formed of the degree of retroflexion. (See Fig. 138.) For example, if the mass supposed to be the fundus of the uterus falls below the level of the cervix, and the angle or groove behind the cervix be very marked, the curve given to the sound must be considerable. But in the majority of instances a moderate curve will be enough. By a little manœuvre, by lifting up the fundus by the finger whilst the point of the sound is passing the os internum, the seat of chief flexion, the whole organ is somewhat straightened. This wonderfully facilitates the passing of the sound. The first stage of the introduction of the sound is best effected by passing the point into the os externum as far as the os internum, with the concavity of the curve directed forwards; then the point should be turned backwards by making the handle describe a large circle, thus bringing the concavity backwards. The handle is then carried forwards whilst the guiding finger lifts up the fundus; the point then following the curve of the canal penetrates to the fundus. When the sound has gone the normal length of two and a half inches, the mobility of the uterus must be ascertained by gently bringing the point of the sound forwards again, so as to lift the fundus and bring it into anteversion. This must be executed gently lest adhesions exist. It is also important, in order to avoid dragging the uterus, and the pressure upon its internal surface which a large revolution of the point of the sound would cause, to reverse the sound by making the handle describe a large revolution. The portion then inside the uterus, if moderately curved, will move upon its axis describing a very small circle, and consequently turning in the cavity without exerting any injurious pressure. In short, the uterine sound should be handled with the same gentle touch, and in a similar manner as the catheter in traversing the male urethra. The *tour-de-maître* practised in reversing the catheter to clear the portion of the urethra under the pubic arch, must be imitated when we seek to bring the retroflected uterus forward into anteversion.

The *reduction of the dislocated uterus* to its normal position is a distinct stage of the operation. The following rule should always be observed, and the more carefully whenever the body of the uterus is enlarged and tender. The fundus uteri must not be lifted directly upwards, lest it impinge upon the lower surface of the overhanging promontory. To clear this, *the fundus must be directed to the left,* towards the sacro-iliac joint. Here there is plenty of room. This movement is effected by the combined pressure of the finger, and the revolution of the sound. (See Fig. 139.)

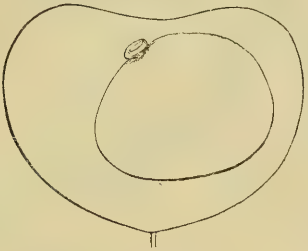

FIG. 139.

TO SHOW REDUCTION OF RETROFLECTED UTERUS BY FINGER. VIEW FROM ABOVE. THE TIP OF FINGER IS SEEN PUSHING FUNDUS OF UTERUS TO LEFT OF SACRAL PROMONTORY (R. B.). (*See also Fig.* 140.)

When the fundus has cleared the promontory, it is then brought forward to the symphysis pubis describing a half-circle round the left side of the pelvic brim.

When restoration is accomplished the demonstration is complete. There is no room for ambiguity. The tumour behind the cervix has disappeared; it has been brought forward to the normal place of the body of the uterus. Supported on the sound it can now be felt by the hand pressed in above the symphysis pubis; and the pressure so exerted upon it is felt by the finger which keeps watch upon the vaginal-portion inside.

On withdrawing the sound, the uterus will often for a time maintain itself in its restored position. But more frequently its fundus will roll back again. If we get all this evidence it is superfluous to discuss what are the conditions which might be mistaken for retroflexion. Nothing but retroflexion will give the evidence described. But it may not be possible or prudent to pass the sound. The two conditions most nearly simulating retroflexion are: a *fibroid tumour* in the posterior wall of the uterus, and a *retro-uterine hæmatocele.* In both cases a firm rounded mass may be felt behind the vaginal-portion separated from it by a groove, and bulging forward the posterior wall of the vagina. But in both cases the body of the uterus may be felt by combined vaginal and abdominal touch above or behind the symphysis pubis. In the case of the retro-uterine hæmatocele the uterus is pressed bodily forwards, and the cervix is generally very close behind the symphysis pubis. Neither of these conditions *per se* excludes the sound. If this be passed, it is easy to demonstrate the position of the body of the uterus, and to distinguish it from the tumour behind the cervix.

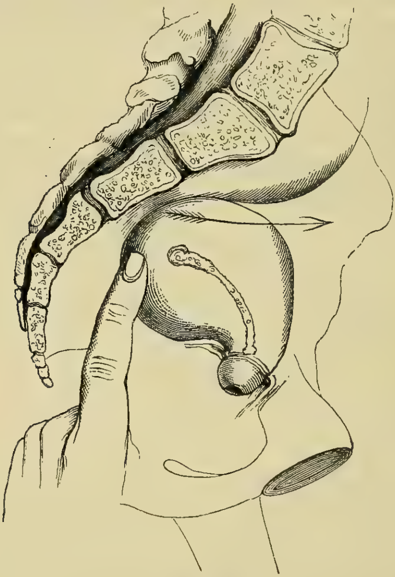

FIG. 140.

TO SHOW THE REDUCTION OF THE RETROFLECTED UTERUS BY THE FINGER. THE BODY OF UTERUS IS PUSHED ACROSS TO THE LEFT OF THE PROMONTORY (R. B.).

The principle of *treatment of retroflexion* is essentially the same in all its forms. One primary object to strive for is to bring the cervico-uterine canal as nearly as possible into one axis, so as to afford free communication between the cavity of the uterus and the vagina. When this is attained the distress due to retention of blood, clots, or mucus will subside. The fulfilment of this indication further implies a considerable rectification of the position of the uterus, which is the next object to strive for. The uterus can hardly be made straighter without

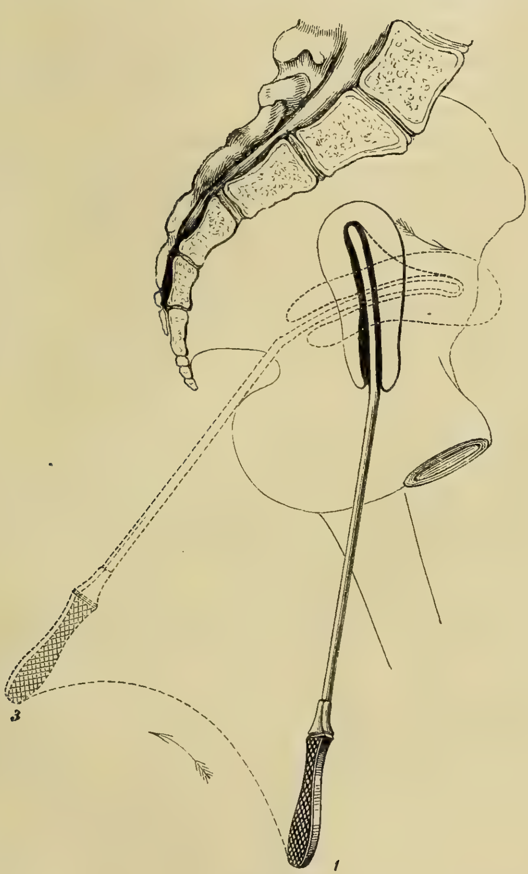

Fig. 141.

TO SHOW THE REDUCTION OF RETROFLECTED UTERUS BY SOUND. 1. THE FIRST POSITION OF SOUND. 3. THE FINAL POSITION. THE ARROWS AND DOTTED LINES SHOW THE MOVEMENT OF THE HANDLE AND JOINT (R. B.).

at the same time lifting up the fundus. When this is done, the engorgement of the body of the uterus will diminish, very often quickly; as the bulk lessens there is a smaller degree of vicious leverage to counteract, so that the cure may be expected to go on at an accelerated pace. The combined progress of rectification and of diminution of bulk brings immense relief to the organs hitherto pressed upon. The rectum especially, and the inferior part of the alimentary canal, are amongst the first organs to benefit by the change. I have known constipation, heretofore obstinate, speedily give way to healthy and regular action of the bowels. And it is needless to say that general amelioration soon follows. The local irritation being lessened, irregular nervous manifestations tend to subside. Greater power of locomotion is gained; and what with freedom from pain and the renewed capacity for exercise, nutrition is often remarkably improved.

A third indication to take is to treat the local complications, whether effects or causes, of the retroflexion. These, that is, the engorgement, endo-catarrh, and other changes in the uterus will, it is true, tend to subside under the means employed to rectify the malposition. But their cure may be accelerated by treatment *ad hoc.*

The first indication is naturally *the reduction of the uterus to its normal relations*:—1. The reduction of simple prolapse with its corresponding retroversion of the uterus is rarely difficult. It is generally enough to lift up the body of the uterus with the finger.

2. Reduction of retroflexion when complicated with considerable enlargement of the uterus as from fibroid tumours or hyperplasia may present considerable difficulty. This difficulty increases with the size of the uterus and the degree of overhanging of the promontory of the sacrum underneath which the enlarged uterus may be locked.

3. Reduction of a retroflected uterus, enlarged as it rarely fails to be after long retention in this unnatural position, may be more difficult still.

4. In the more difficult cases then it is desirable to bring to our aid all the mechanical means at our disposal. The first of these is *the placing the patient in the most favourable posture.* There are two positions which are eminently useful. The first is that known as Sims', the semi-prone position. In this the woman lies on her left side, with the knees placed on the abdomen, the body well rolled over on the chest, the left arm turned over the back, and the head elevated as little as possible. For the greater number of mere digital examinations this is the best posture. For the reduction of the greater number of the complicated dislocations and distortions above referred to this posture is the most convenient and effective. It readily permits the operator to carry out all the manœuvres by finger and sound which I have taken pains to describe and illustrate under the preceding paragraphs on diagnosis.

In a certain proportion of cases still more difficult, when the enlarged retroflected uterus is impacted under a projecting promontory, we may invoke the aid of the genu-pectoral posture, the advantages of which are so well illustrated by Dr. H. F. Campbell (*Gynæcological Transactions,* vol. i. 1876). When the woman is placed in this posture the following mechanical powers come to our aid : (1) The abdominal viscera falling downwards not only remove the pressure they exert upon the uterus in the ordinary postures ; but (2) by the falling forward and downward, this " draft of the viscera " exerts a *suction-force,* tending to draw in air by the pelvic openings ; and now if (3) the hand or finger be introduced into the vagina, air rushing in restores the atmospheric equilibrium. This Campbell calls the " pneumatic reduction of the dislocated womb." It will be observed that all these concurrent forces act without invoking the fourth, namely, the influence of gravity on the uterus itself, which will of course tend to aid the rest.

The first indication and the second can hardly be dealt with separately. To straighten the axis of the uterus and to restore the fundus to its normal position are objects attained concurrently by the same means. These means are mostly mechanical. Before applying these it is often desirable to give an opportunity for any excessive engorgement or inflammation that may exist, to subside under rest in bed, perhaps local bleeding, salines, sedatives, and by the regulation of the bowels by gentle aperients and enemata. Admitting the great importance of this course as a preliminary condition of cure, I cannot agree with those who rely upon it as sufficient to cure. I have indeed, in not a few cases, seen retroversion and retroflexion of the secondary form relieved, the womb regaining its position apparently spontaneously under rest and the other means enumerated. But in some, at least, of these the cure would probably have been accelerated and made more sure by the timely recourse to mechanical support. And expectancy, aided or not by these means, will certainly bring no rectification of a primary retroflexion. The management of a primary retroflexion will often differ from that of a secondary retroflexion in this : The primary retroflexion is often complicated with a marked degree of stenosis of the os uteri externum. This is an additional cause of obstruction and retention which rarely exists in the secondary form. It is the first thing that requires treatment. The os externum should be enlarged, whether it be the case of a single woman applying for relief of dysmenorrhœa, or that of a married one, to whose menstrual difficulty are superadded dyspareunia and sterility. The operation is in all respects the same as that described under dysmenorrhœa from stenosis of the os externum. The os is divided on either side so as to give a free opening into the cavity of the cervix. This in itself diminishes the down-curving of the vaginal-portion, and independently of special means for straightening the uterus it virtually straightens its canal. This obstacle being removed, the treatment of the primary retroflexion becomes the same as that of the secondary form, excepting in this, that there is more likely in the latter form to be an inflammatory complication of the cervix. This requires special treatment, which may, however, go on concurrently with the treatment for rectification.

The means brought forward at different times for the rectification of the retroflected uterus are numerous. Experience has eliminated some as ineffective or injurious, and has established the value of others. We need not dwell upon exploded contrivances; but we cannot pass by without discussion the merits of *intra-uterine pessaries.* The idea of straightening the bent uterus, and fixing it in its normal position by introducing a rigid stem into its canal, was revived, if not first conceived by the late Professor Simpson. It was taken up and largely tried by Valleix. Cases, not a few, are known in which death from metroperitonitis followed the use of instruments of this kind. The intra-uterine stem being attached to an external support it could hardly be expected to be free from this danger.

All instruments which disregard the physiological fact that the uterus is a moveable organ should, I think, be unhesitatingly discarded as vicious in principle and dangerous in practice. All intra-uterine stems carried on supports having a *point d'appui* outside the body fall under this ban, even although a certain amount of elasticity be introduced into some part of the apparatus. It may be said, without injustice to the ingenuity displayed in the elaboration of these contrivances, that they have fallen into disuse under the combined influence of the disasters which attended their use, and of the introduction of better means, especially of Hodge's lever-pessaries.

The objection above urged does not apply to the simple intra-uterine stems which are unconnected with external supports, and which do not control the uterus in its movements. The best of these is the late Dr. Wright's, or a modification of it. The safest is made out of one piece of vulcanite. This instrument is about two or two and a quarter inches long. When mounted on its carrier for the purpose of introduction it is a single solid stem. When introduced and the carrier is withdrawn, the stem opens by the elasticity of the two branches of which it is composed, so that the ends fit the normal triangular shape of the cavity of the cervix. This expansion helps to lift up the fundus, and the uterus thus supported is kept nearly straight. Still this will not always bring the fundus forwards; it remains in retroversion. For complete restitution we must rely upon Hodge's lever-pessary. This will now operate with increased advantage, as the lever formed by the uterus upon which it has to act is straighter and firmer. This separate mode of using the intra-uterine and the extra-uterine pessaries is, in my opinion, the safest and most satisfactory in its results.

The mobility of the parts is sufficiently respected; and opportunity is given for the recovery of the natural tonicity of the cervix uteri (see Fig. 143).

I cannot approve of those instruments in which the intra-uterine stem is set on a ball or ring, or the cross-bar of a Hodge's pessary. This is a kind of impalement which limits too much the mobility of the uterus, and which is apt to cause inflammation of the uterus or surrounding tissues.

All intra-uterine pessaries are apt to cause pain, hæmorrhage, and inflammation. The patient must be carefully watched during their use; she should observe the utmost moderation in everything; and in the event of pain the instrument should be at once removed.

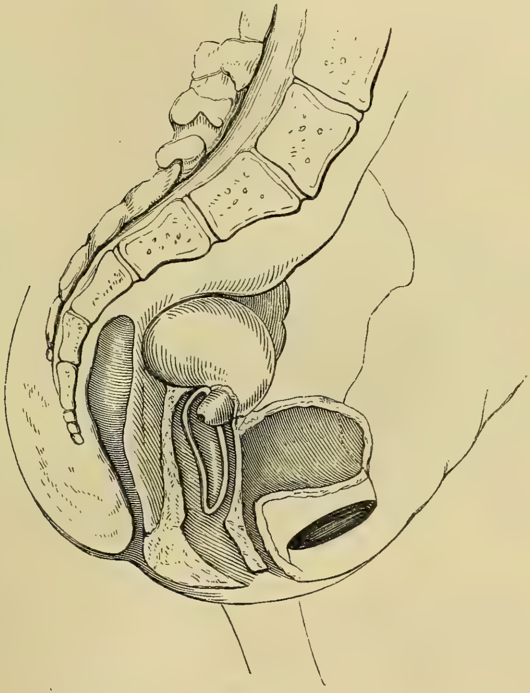

FIG. 142.

ILLUSTRATING OCCASIONAL VICIOUS ACTION OF THE HODGE IN EXTREME RETROFLEXION OF THE UTERUS (R. B.).

The upper limb gets wedged in the angle of flexion, and lifts the whole organ up without straightening it.

Before using any form of intra-uterine pessary, it is desirable to ascertain whether the object cannot be attained without using them at all. The cases where it is necessary to use them are exceptional. The Hodge has happily almost driven out of use the fixed intra-uterine stem. Before applying a Hodge, it is useful to bring the retroflected fundus forward into its proper position. We thus increase the length of the post-cervical vaginal *cul-de-sac* and give room for the pessary to rise well behind the cervix, a condition of its efficiency.

In the majority of cases a simple Hodge-pessary modified in shape and size to suit the peculiarities of the case, is the best instrument to use. It may be worn continuously for several months, under occasional inspection. Pregnancy not infrequently takes place whilst it is worn. Indeed, I have little doubt that the action of the instrument favours impregnation. When this occurs it is desirable to continue the use of the instrument until the end of the third month of gestation, that is, until the fundus of the uterus has risen out of the pelvis. By this plan the dangers of abortion and of locking of the uterus in the pelvis are greatly lessened.

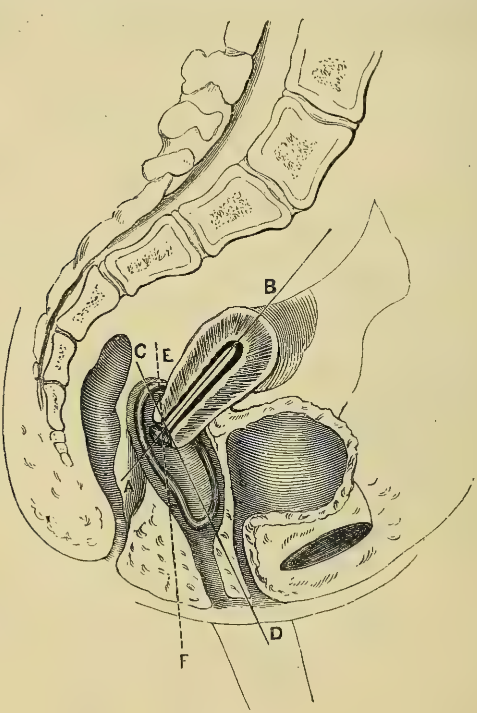

FIG. 143.

ILLUSTRATING THE COMBINED ACTION OF THE INTRA-UTERINE PESSARY AND THE HODGE (R. B.).

The first straightens the uterus, converting it into a firm lever A B. Then the second forming another lever, C D, lifts up the fundus. E F shows the leverage-movement of the Hodge C D. Under inspiration, E lifts up the body of the uterus.

CHAPTER XXIII.

INVERSION OF THE UTERUS; DEFINITION: ACUTE AND CHRONIC; CAUSES, IN THE PARTURIENT AND NON-PREGNANT UTERUS; SYMPTOMS, COURSE AND TERMINATIONS; PROGNOSIS; DIAGNOSIS; TREATMENT.

THE history of recent inversion of the uterus belongs especially to obstetrics. In my work on *Obstetric Operations,* I have traced this history with some care. This of course includes the study of the causes which lead to the greater number of inversions. A very large majority of cases follow immediately upon labour. But it is important to remember that inversion has occurred quite independently of labour, although it seems necessary that conditions in some important respects analogous to pregnancy and labour should exist. Such, for example, is the case when a polypus attached to the fundus uteri induces development of the muscular wall, and expulsive action being excited, the fundus uteri follows the tumour, producing inversion.

Inversion of the uterus may be defined as a dislocation by which the inner wall of the uterus is turned outwards; its cavity disappearing, and another cavity forming above, the inner surface of which is the proper external covering of the uterus. This cavity contains a portion of the Fallopian tubes and of the round ligaments, which are dragged in by the fundus uteri. Even convolutions of intestine may fall in. And in the recent state after labour, the ovaries also may be drawn in. But in the chronic state, when the uterus is much reduced in size, the ovaries are found outside the artificial cavity.

There are *degrees of inversion.* The most simple division is that proposed by Crosse (see Fig. 144). 1st. *Depression;* the fundus or placental site falls inwards, projecting in the cavity of the uterus. 2nd. *Introversion,* or intussusception. So great a part of the fundus falls in that it comes within the grasp of the portion of the uterus into which it is received. In the extreme form of this degree the fundus reaches to the os uteri, through which it may be felt like an intra-uterine polypus. 3rd. *Perversion;* the fundus passes through the os uteri. There are degrees of this. In the extreme form the inversion is so complete that even the cervix and os are inverted.

Inversion is *acute* or *chronic.* In my article on this accident in Samuel Lane's edition of Samuel Cooper's *Surgical Dictionary,* I defined *acute inversion* as ending with the completion of the involution of the uterus. When this process is complete, the case is chronic. The distinction is based upon the important facts that whilst involution is going on, the muscular fibres are still possessed of some active property, the organ is larger, and the cervix less rigid. During this stage the parts are more yielding, and reduction is comparatively easy. It is the chronic form including cases which occur independently of labour with which we are now principally concerned. But some reference to the conditions under which inversion is produced will not be out of place.

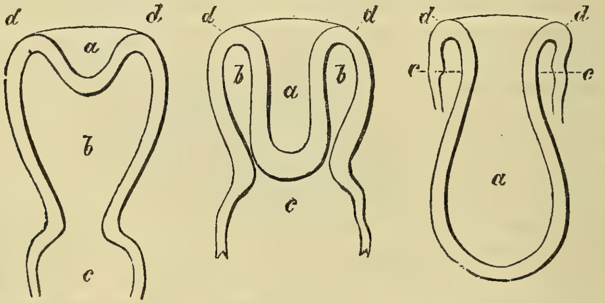

Fig. 1.—*Depression.* Fig. 2.—*Introversion.* Fig. 3.—*Perversion.*

Fig. 144.

ILLUSTRATING THE THREE DEGREES OF INVERSION OF THE UTERUS (FROM CROSSE).

a. The inverted fundus. *b.* The natural cavity. *c.* The vagina. *d d.* The upper margin of the cup formed by the inverted fundus uteri.

The two following drawings (Figs. 145, 146) represent the conditions of chronic inversion and the relations of the several parts.

Fig. 146 is reduced from an original drawing by M. Biot for Mr. Crosse (see his Essay). It represents a preparation in the Musée Dupuytren at Paris. The subject died of exhaustion twenty-two months after labour.

Causes.—The essential conditions for the production of inversion are: on the one hand, relaxation of some part or the whole of the walls of the uterus, and, on the other, considerable enlargement of its cavity. When the uterus has contracted, its walls are so thick, and the cavity is so reduced, the anterior wall being flattened close in contact with the posterior wall, that inversion cannot take place. Of this any one may convince himself by passing his fingers into the living uterus during active contraction, or by trying to invert a uterus out of the body which has been well contracted.

Adhesion of the placenta growing from the fundus is a frequent cause. This is often united with spastic narrowing of the lower segment of the uterus. This narrowing will generally prevent complete inversion. In this case the os uteri may not relax until partial inversion has lasted some time. The mechanism by which inversion is produced, as illustrated by the writings of Smellie, Lucas, John Hunter, Crosse, and others, is explained in sufficient detail in the *Obstetric Operations.* Here we are more especially concerned with inversion in the chronic stage.

John Hunter describing a specimen in the College of Surgeons in which inversion was caused by the attempt to expel a tumour from the uterine cavity likens the process to intussusception of the intestine.

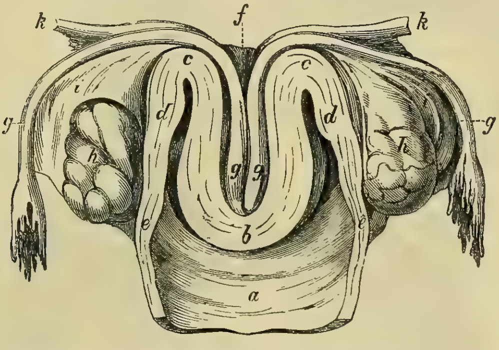

FIG. 145. (Half-size. From Crosse's Essay, taken from a specimen of Dr. Mackenzie, of Glasgow.)

EXTREME INVERSION IN SECTION.

a. Vagina. *b.* Fundus uteri. *c c.* Angles of inflexion. *c c, d d.* Mark the extent of the uninverted *cervix.* *f.* The peritoneal *cul-de-sac* of inverted uterus. *g g.* Fallopian tubes passing down to the inverted fundus. *k k.* Round ligaments. *h h.* Ovaries. *i i.* Broad ligaments.

Professor E. Martin relates a case of complete inversion of the uterus in a multipara caused by a fibrous growth in the fundus. A woman, aged forty-six, was seized with profuse uterine hæmorrhage, which often returned. Two years later a tumour was observed protruding through the vulva, and causing retention of urine. The tumour was so little sensitive that the patient cut off a piece with scissors. It was as large as a fist. It was found united by a pedicle to the fundus of the inverted uterus, no trace of os uteri being left. The tumour was cut off by an écraseur. Attempt to reduce the inverted uterus was postponed. A few days afterwards it was found that the spontaneous re-inversion had taken place. The patient recovered (*Monatsschr. f. Geburtsk.*, 1869).

B. Langenbeck (*Med. Centr. Zeitung*, 1860) exhibited the inverted uterus of a woman who had never been pregnant. On the inverted fundus was seated a fragile, sarcomatous heterologous growth of broad basis, the size of a walnut. Abarbanell (*Monatsschr. für Geburtskunde*, 1861) relates the following: A woman had become very anæmic from frequent hæmorrhages. A smooth tumour, the size of the fist, was first felt protruding from the uterus; fourteen days later, under violent expulsive pains, with profuse hæmorrhage, the tumour was driven through the external genitals, and the uterus was completely inverted. The tumour was amputated, whereupon the uterus quickly replaced itself. McClintock gives a case (*Diseases of Women, Dublin*, 1863). Dr. Emmet (*Amer. Journ. of Obstetrics*, 1869) relates a case. He first amputated the tumour by the wire écraseur, and subsequently reduced the inversion by the manœuvre described further on.

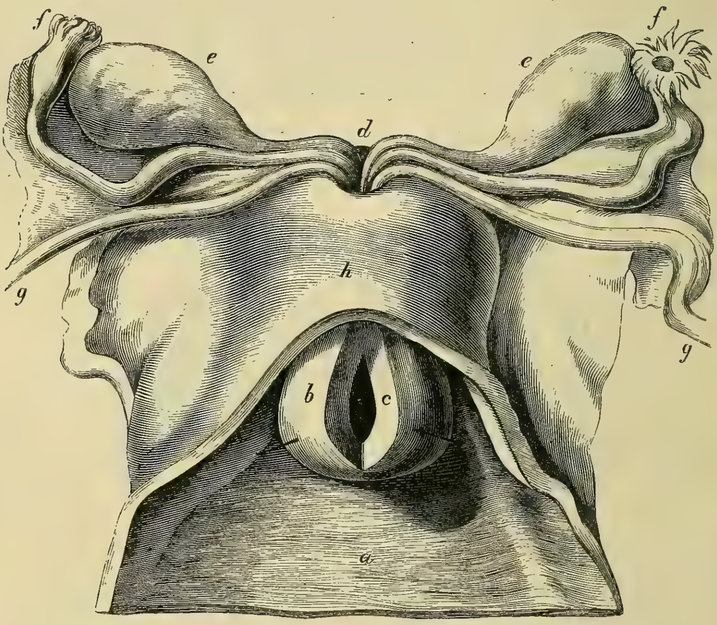

FIG. 146. (Two-thirds size.) (After Crosse. Specimen in Musée Dupuytren.)

a. Vagina. *b.* Inverted fundus incised at *c* to show its cavity. *d.* Point of inversion with round ligaments, Fallopian tubes, and ovarian ligaments drawn in. *g g.* Round ligaments. *e e.* Ovaries. *f f.* Fimbriated extremities of tubes. *h.* Cervix covered by peritoneum.

In University College Museum is a remarkable specimen, No. 871. A large mushroom-shaped tumour is attached to the fundus uteri by a base so broad that it quite caps it. The uterus is laid open, showing the round ligaments and tubes drawn into it. This specimen is thus referred to by Crosse (part i. p. 45); the case is published by D. D. Davis, *Principles of Obstetrics*, (i. 618, pl. 21):—"The patient was brought to the Middlesex Hospital in a dying condition; the polypus tumour prolapsed beyond the external labia. The preparation is unfavourably displayed. Calculating from the *ostium urethræ*, about one inch of the vagina remains uninverted, so that the angle of its reflection, where the circular *cul-de-sac* terminates, is situated at the depth of an inch, from which the inverted vagina extends downwards two inches, forming a tube, which terminates in the uterus, at which termination there is a distinct thickening or circular prominence, answering to the cervix uteri, completely inverted. The cut surface of the inverted uterus is nearly an inch in thickness, and the peritoneal pouch formed by it is very small, and its whole extent is laid open. There is no observable alteration in the bladder from its normal position, the superior fundus rising prominently towards the abdomen; and in the posterior view the ovaria are of large size, and lie close to each other at the margin of the peritoneal pouch, tucked in behind the bladder. The peritoneal pouch, though narrow, must be about four inches in length, two answering to the inverted vagina, and the rest to the uterus totally inverted. The left corpus fimbriatum is adherent, the right loose and floating."

In St. Bartholomew's Museum is a specimen (No. 32.12) illustrating this point. "The uterus contains a large fibrous tumour which has grown from its fundus, and projects into the vagina. The fundus of the uterus is *partially inverted*, being drawn down by the weight of the tumour. Its inner layers also, enveloping the tumour, are elongated, so as to form a pedicle or neck by which the tumour is attached like a polypus. Similar tumours of smaller size have formed." In St. Bartholomew's Reports, 1872, another history is related of inversion caused by a polypus. The uterus was restored to its position.

The *symptoms of recent inversion* are chiefly those of shock, indicating sudden severe injury. They vary with the degree and progress of the inversion. Thus, the first degree, or simple *depression*, may be unattended by pain, and indicated solely by hæmorrhage and a corresponding depression of the vital powers. The hæmorrhage comes from the relaxed introcedent part. The depression at the fundus may be felt through the abdominal walls as a cup-like hollow. As the descent proceeds, and becomes *introversion*, urgent symptoms arise, according to the degree of compression exercised by the uninverted portion upon the inverted portion. A sense of fulness, weight, as of something to be expelled, is felt. Expulsive efforts, both uterine and abdominal, sometimes very violent, follow. Hæmorrhage is not constant. It seems that when the inverted portion is firmly compressed, the hæmorrhage is arrested, and that bleeding is a mark of inertia. When the inversion is complete, the uterus is felt in the vagina, or may even be seen outside the vulva. Then pain and collapse are aggravated. Clammy sweats, cold extremities, vomiting, alarming distress, restlessness, extinction of the pulse occur. During the expulsion the woman has often exclaimed that her intestines were passing from her. A tumour appears in the vagina, or externally, generally covered by the placenta. The cord is traced up to the insertion, and the placenta, of convex form, is spread over the tumour.

The shock, either with or without hæmorrhage, is sometimes so great as to quickly extinguish life. Cases are known where the shock attending simple depression has been fatal. Where the case is not fatal, and the uterus is not reduced, the symptoms of chronic inversion succeed. First, the tumour by its bulk, causes distress of the bladder and rectum. Then it is probably forced externally. Chronic inflammation, thickening and induration of the parts ensue; the surface may become dry from exposure, or ulcerated and bleeding from chafing. It may be difficult or impossible to reduce it within the vagina. If the tumour remain within the vagina, it may still be a source of chronic irritation to the vagina, and may itself be the seat of chronic inflammation. Congestion, abrasion of surface, ulcerations, give rise to profuse muco-purulent leucorrhœa, frequently to hæmorrhage. Irritative fever, emaciation, pain, discharges, break down the constitution, and after some months, or even years, the patient may sink from exhaustion. As Windsor remarked, an epoch of especial danger is that of weaning and the resumption of menstruation. The discharges of blood then become more frequent and profuse. When the climacteric age has been reached, the uterus undergoing natural atrophy, severe symptoms may subside, toleration ensuing.

In the recent state retention of urine is not uncommon, owing to the distortion and compression of the neck of the bladder and urethra. The retention has been relieved when the uterus was restored.

Cases have been known of the *inverted uterus sloughing off*, Saxtorph (in *Actis Soc. Med. Hav.*); Deborieir (*Richter's Chir. Bibl.*); Radford (*Dublin Journ. of Med.*, 1835). In other cases the strangulation caused by the cervix has ended fatally before there was time for sloughing (Velpeau). More marvellous still, cases have occurred in which the recently inverted uterus has been torn away by the attendant, the patient recovering (Dr. J. C. Cooke). J. L. Casper says (*Handbook of Forensic Medicine*, New Sydenham Soc. Translation, vol. iii.) laceration of the pelvic ligaments may attend spontaneous inversion of the uterus.

E. Clemensen relates * a case of complete inversion, in which *the uterus separated by gangrene*. A woman at fifty had borne two children, the last thirteen years ago. Some eight years ago she observed that the uterus prolapsed (it was probably inverted). A profuse hæmorrhage took place. The uterus was then found completely inverted between the thighs, the size of two fists. In several spots lacerations were observed extending into the muscular tissue. Some days later the uterus seemed diminished in size; irritative fever set in; gangrene showed itself in the left side of the uterus. The uterus contracted more and more. At last only the orifice remained as a scar. The woman recovered. Clemensen attributes the origin of the inversion to the altered texture of the organ, resulting from fatty regression after labour.

In recent inversion death has ensued from *strangulation of intestine in the uterus*. Gérard de Beauvais relates a case (*Acad. de Médecine*, 1843). But such a termination can hardly occur when the inversion has become chronic. It is a remarkable circumstance that notwithstanding the extreme difficulty experienced in reducing an inverted uterus, it very rarely happens that the constriction of the os is sufficient to close the inverted cavity, or that adhesion exists. Commonly the finger is readily admitted, and even through the abdominal wall a passage into the cavity may be felt.

Sometimes, the uterus being irreducible, death ensues from hæmorrhage, as in a case described in St. Bartholomew's Catalogue (specimen No. 32.56), and reported by Dr. West (*Pathological Proceedings*, vol. iii.). "Uterus entirely inverted, with the exception of the os, which, however, does not cause any constriction, the finger passing easily between it and the uterine wall. The openings of Fallopian tubes not discovered. The peritoneum at the point of inversion is thickened and uneven, the insertions of the uterine appendages are drawn into the *cul-de-sac* of inverted uterus. This inversion was irreducible, and the displacement of the uterus caused death in consequence of frequently recurring hæmorrhage twenty-nine months after its occurrence."

A remarkable termination is illustrated in the following case, of which the specimen is preserved in the London Hospital (No. Ea 57). "Uterus perforated at its fundus by disease. Its mucous membrane appears to have been everywhere destroyed and at its fundus is an aperture the size of a shilling." Dr. Ramsbotham thus refers to it: "Ulceration having commenced in the whole lining membrane of the uterus has almost destroyed the uterine texture, and has formed an opening into the peritoneal cavity. The uterus is turned inside out. Epithelial carcinoma of the internal uterine membrane. I have seen only one other such case."

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* "Hospital Tidende," 1865.

Crosse says, "there is not a shadow of evidence of *total inversion* in the strict sense replacing itself spontaneously." A few cases, as those related by Boyer (*Maladies Chirurgicales*) and Baudelocque (*Daillez, Thèse*) are examples of reduction following external force in the form of a blow or succussion. Dr. Meigs, nevertheless, relates several cases. Of such cases Dr. West remarks that "it is easier to conceive that an experienced man should commit an error of diagnosis, than to understand how any efforts of Nature could cure a chronic inversion of the womb." The error may be one of the two following—either the tumour was a polypus, which has disappeared by being spontaneously cast off, or it was a true inverted uterus, which has been separated by sloughing, and cast off in like manner.

In some instances the subject of inversion has evinced more or less perfect *toleration* of her infirmity. This was the result in a case reported by Guyon (*Journ. de Chir. et de Méd. prat.* 1861), in which inversion had existed twenty years without alteration of health ; in one by Dr. Comstock (*Boston Med. and Surg. Journ.*, vol. viii.) : the patient followed her occupation as a dairy-maid ; in one by Dewees (*Midwifery*) : she was enjoying good health ten years after the accident ; in one by Ramsbotham : the patient regained flesh, her health became good ; in one by Lisfranc (*Clin., Chir.*, 1843) : in the body of an old woman examined at the Salpêtrière, the uterus was completely inverted, this had not been suspected during life ; in one by Dr. C. H. Lee (*American Journ. of Med. Sc.*, 1860) : inversion remained undetected for twenty-five years, ablation was given up, the patient was so well ; in other cases referred to by Gregory Forbes,* in one reported by Dr. Woodman (*Obstet. Trans.*, vol. ix.) brought to the London Hospital, whilst I was obstetric physician there, and in Dr. Mackenzie's case (see Fig. 146) toleration was established.

When reduction has been effected, the uterus may recover its function, and pregnancy ensue. There is also a probability, not indeed high, but suggesting caution, that inversion will again take place during labour. For a long time after replacement the cavity of the uterus probably remains shorter than normal. The thickened walls take time to resume their natural condition. I state this from the observation of a case reduced by myself. This depends no doubt in some instances upon the reduction being imperfect, the fundus remaining in the state of depression, or squatting.

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* "Medico-Chirurgical Transactions," vol. xxxv.

The *prognosis* must always be serious. Weber truly calls inversion "*malum ingens periculique plenum.*" Crosse, who has shown the greatest industry in the collection of cases, says that above one-third of all the cases, under whatever circumstances, or in whatever degree they occur, prove fatal either very soon, or within one month. He analyzed 109 fatal cases. Seventy-two proved fatal within a few hours, most of them within half an hour; eight cases proved fatal in from one to seven days; and six in from one to four weeks. If the patient survive a month the case is chronic, and the immediate danger is small. But the danger recommences at eight or nine months, when the menstrual function is resumed. Many of these will die within two years. If the inversion take place suddenly and completely, the uterus remaining flaccid, the danger is extreme; if it take place slowly, that is, under spontaneous uterine action, the danger is less.

As to the prospect of reduction, a much more favourable expectation than was lately held is justified by the improved methods of treatment; and reduction will diminish the mortality. Denman thought that if two hours had elapsed reduction could not be effected. But more recent experience has abundantly proved that both in the recent and chronic cases reduction can in the great majority of instances be accomplished. If the patient survive the first dangers of shock and hæmorrhage the prospect of recovery under surgical treatment is good.

The *diagnosis* is especially important; it is not always easy; and the most deplorable consequences have followed from error. M. A. Petit had a patient in the hospital at Lyons. Six surgeons decided that it was polypus, and a ligature was applied. A shriek caused suspicion of inversion; the ligature was removed; but the woman died at the end of five days. On examination inversion was found. Dr. Wm. Hunter tied what he thought was a polypus in a young woman who said she had never been pregnant. She died; the uterus was found inverted.

Dubois (*Dictionnaire de Méd.*, 1846) says he knew of two cases of inversion mistaken for polypus by two of the most skilful surgeons in Paris. In one case a ligature was put on; the patient died in thirty-six hours.

In the presence of the recent accident the most frequent mistakes have been to suppose the mass is a second placenta, or the head of a second fœtus. The forceps has been applied to the inverted uterus to drag it away.

The diagnosis is especially difficult when inversion is complicated with polypus. The polypus may be detected, but not the inversion, and a ligature applied to the polypus may include a portion of the uterus. Gooch relates (*Diseases of Women*) the following case:—Dr. Denman passed a ligature round a polypus of the fundus; as soon as he tightened it, he produced pain and vomiting. As soon as the ligature was slackened these symptoms ceased; but whenever he attempted to tighten it the pain and vomiting returned; the ligature was left on, but loose; the patient died about six weeks afterwards, and on opening the body it was discovered that the uterus was inverted, and that the ligature had included the inverted portion.

The following case occurred to Dr. Gooch at St. Bartholomew's, in 1828:—The patient had been delivered by forceps six months before. When standing, a large tumour protruded externally, but could easily be replaced. The os uteri could not be felt. The ligature was applied round what was supposed to be the stalk of the tumour: it occasioned little pain when first applied, but towards evening pain became so severe as to resemble labour. She died on the fifteenth day after the operation. The uterus was of natural size and structure. The tumour grew from the orifice of the uterus all round, so as to be continuous with the cervix, and to make it impossible to say where the neck of the uterus ended or the stalk of the tumour began. The ligature had included the projecting neck of the uterus. The posterior part had occasioned ulceration into the cavity of the peritoneum. There was no inflammation of the peritoneum.

The diagnosis has to be made under the two different circumstances of recent occurrence and chronicity. In the *recent* case the history furnishes useful indications. The sudden sense of injury and shock, following labour, suggests immediate exploration. Negative and positive signs concur in pointing to a conclusion. In the first place the uterus is not felt, as it ought to be, a firm, round ball behind the pubes. On pressing the hand firmly into the pelvic cavity from above downwards, behind the symphysis, a vacuum is felt. Keeping the hand in this situation, the fingers of the other hand are passed into the vagina, and there a mass rounded, soft, or firm is felt. The relations and position of this mass are clearly defined between the two hands. If the placenta is attached, the uterus is obscured by it. But bared, the diagnosis will be cleared up, if the finger is carried all round the mass up to its insertion. On pressing the mass upwards as in attempt to replace it, the fingers exploring through the abdominal wall will sink into a pit formed by the disappearance of the uterus through its os. Then the finger in the vagina exploring the root or insertion of the tumour comes to a circular furrow at the fundus of the vagina, and a prominent ring, which is the os uteri. If the inversion be not complete, the finger, or more easily the uterine sound, will pass a little way between the ring formed by the os and the pedicle of the tumour. If the inversion is complete, only the furrow will be felt. If the inversion has been followed by prolapse of the mass beyond the vulva the exploration is easier, as the tumour may then be felt continuous by its origin with the inverted vagina. It may also be seen. Its aspect is that of a florid tumour with a very vascular velvety surface, easily bleeding on the slightest touch, or if the presenting part be that to which the placenta had grown, it is uneven, of a dark hue, with placental shreds or coagula attached to it. The tumour is painful to the touch. Any attempt to drag upon it causes a sensation described by the patient as if her inside were being pulled out. Pain is also felt down the legs. Vomiting is likely to occur. In size the tumour may equal a child's head, or it may be no larger than a fist. A crucial test is the alternation of the mass from contraction to dilatation. This vital act inducing characteristic changes of size and consistence pertains to the uterus alone.

The diagnosis from polypus is not always easy. A polypus may complicate pregnancy. Pregnancy usually causes an intra-uterine polypus to grow at an accelerated ratio. After the birth of the child, the polypus will be extruded, perhaps dragging the fundus uteri a little with it, thus simulating, if not producing, a minor degree of inversion. To distinguish this from inversion it must be remembered that polypus thus appearing after labour is actually even more rare than inversion. The probability, therefore, of inversion ought to operate with at least equal force upon the mind of the surgeon. The chief points of distinction are: that a polypus is not sensitive; it does not change its form, size, or consistency; it does not contract or relax. Its expulsion rarely produces severe shock. In form and size polypus may resemble inversion, but it differs in relation to other parts. It is quite possible that the placenta may have been partially attached to the surface of the polypus; it will then exhibit placental shreds and clots like the uterus. The finger and sound must be relied upon to make the case manifest. The hand outside will discover the uterus *in sitû* behind the pubes. The finger in the vagina will travel round the polypus, between it and the ring of the os uteri which embraces it. If the attachment of the tumour is to the cervix, the pedicle will be felt on one side of the circumference, whilst in the other parts the finger or sound will pass several inches beyond into the cavity of the uterus. If the attachment is at the fundus, then the sound will pass all round.

The difficulty of distinguishing inversion in the *chronic* state from polypus is greater. Velpeau having in error tied an inverted uterus, said, "I know too well that there are cases in which doubt is the only rational opinion." Soon after the accident the uterus diminishes greatly in bulk, becomes harder, perhaps less sensitive, and, in these features, more nearly resembles polypus. But setting the history—always a fallacious diagnostic element—apart, the means of discrimination are satisfactory. The speculum may reveal the oozing of the menstrual fluid. In other respects its use is doubtful.

The sound is of more value. "If," says Simpson, "it passes two inches and a half or more beyond the edge of the cervix, the disease is not inversion of the fundus; if it cannot pass at any point around the stem of the tumour to a greater extent than about one inch, the uterine cavity may be considered as shortened by inversion." The inverted uterus is flattened anteriorly and posteriorly; its largest point is lowest; it diminishes very gradually, presenting a comparatively large neck at its highest part, where it is encircled by the inverted cervix, if the inversion is not complete, and by a thickened ring or ridge if complete. The size of the inverted uterus is scarcely larger, and is often smaller, than in the natural state. Herbiniaux placed so much stress upon this as to affirm "that if the tumour be so large as to distend the vagina and prevent your getting at the os uteri, it may be boldly pronounced polypus, and not a partial inversion, which is always of small size, and fills the vagina."

The form of the tumour has been thought to offer distinctive characters. S. Cooper described the inverted uterus as forming a mass wider or as wide above at its origin as at its most dependent part, whereas in polypus the neck is narrower. This is often true, but not constantly so; and it would not be safe to rely upon a variable sign. J. G. Forbes describes a case of complete inversion of eighteen months' standing, in which the tumour close to the os was four inches and a quarter in circumference; this was the widest part. This seems to be more especially the character of incomplete inversion. In many cases of complete inversion the upper part is narrowed so as not to be distinguished in this respect from many polypi. This was the condition in two cases observed by myself.

A sign insisted upon by Crosse is the feeling the stretched round ligaments within the tumour (inverted uterus), and pain being produced in the groins on lowering the tumour a little so as to render the tension greater. To this I would add that by drawing the tumour well down by a vulsellum or a noose (see Fig. 147), the insertion of the root in the vaginal roof being put on the stretch, the continuity of the two parts is made manifest.

Malgaigne advises the following method: Introduce a male catheter into the bladder, direct its end downwards and backwards, so that, carrying the coats of the bladder before it, it may enter the peritoneal *cul-de-sac* formed by the inversion, and be felt by the finger in the vagina through the coats of the inverted organ. Another method is this: The catheter in the bladder, direct the end backwards so as to bring it to project in the rectum where a finger will feel it with only the coats of the rectum and bladder intervening; but if the firm resisting uterus be there, the end of the catheter will not be felt. Digital examination by the rectum will also enable the surgeon to explore the tumour in the vagina more fully. Often the end of the finger will get above the tumour, thus completely exploring it. If the uterus be in its place, it may thus be felt between the finger in the rectum and the finger of the other hand pressed down behind the pubes. If the uterus be inverted, then the vacuity above the tumour felt in the vagina will indicate that this tumour is the uterus. This mode of exploration should never be omitted. Dubois takes occasion to say that the mistakes he refers to, in which death occurred from ligaturing an inverted uterus, would not have been made if exploration by catheter in bladder and finger in rectum had been resorted to. Where doubt exists there is still another mode of exploration which gives absolute evidence. Under anæsthesia the hand may be passed into the rectum, so that the fingers may feel *above* the tumour and completely command its whole contour. To get well at the root of the tumour the hand may be passed into the vagina. The operation is not very difficult, and if carefully performed no injury will result.

An intra-uterine polypus sessile on a broad basis may simulate partial inversion. The diagnosis will be established by the hand outside feeling the unimpaired rotundity of the uterine fundus in the first case; and the cup-shaped depression on its sphere in the second case. The sensitiveness of the inverted uterus furnishes indications. Thus Guéniot (*Arch. Gén. de Médecine*, 1868) recommends acupuncture of the tumour to test this property. But it must be confessed—at least, I make this admission on my own behalf—that the sensitiveness of the inverted uterus has been more distinctly revealed by applying a ligature or wire around its neck with a view to removal for a polypus. Regarding this fact, and the associated fact, that a polypus is not sensitive, I have insisted upon the rule that patients should never be submitted to anæsthesia for the removal of a polypus. Pain may give the last warning, and save the patient at the last moment.

The diagnosis from prolapse of the uterus and vagina ought not to be doubtful. The presence of the os uteri at the lowest point of the tumour, admitting the sound for a distance of two and a half inches or more, at once decides the existence of prolapsus.

The difficulty of diagnosis has been felt even in the presence of the parts put up in spirit. Thus Crosse, by further dissection, proved that a specimen, which for years had passed for one of inversion in the Glasgow museum, was in reality one of polypus growing from and perfectly occluding the os uteri. He pleads with pardonable urgency that the mode of putting up these specimens is bad; and that the tumour ought to be slit open by a longitudinal cut so as to expose the cavity and its contents.

I possess a wax-model taken from a patient who came under my care in the London Hospital. There was a procident mass outside the vulva which was for some time taken to be a fibroid tumour attached to the fundus of the inverted uterus. It was only after prolonged examination that a small opening, seated in the angle of junction of the tumour, was discovered by means of the sound to be the os uteri. The tumour had grown by a broad basis to the cervix, and had caused not inversion but prolapsus. The model is figured in the *Obstetrical Trans.*, vol. iii.

What has been said will indicate some of the principles of *treatment.* The treatment of *recent* inversion will be found fully discussed in the *Obstetric Operations.* In this place we are chiefly concerned with *chronic* inversion.

If the opportunity of reducing within a few hours or days be lost, the difficulty increases through advancing involution of the uterus and contraction of the os. Still the same manipulation may be attempted. We must act steadfastly in the faith that pressure sufficiently long kept up upon the os uteri will cause it to yield. It is really a question of time—too long a time indeed for the hand of the surgeon to work—but not for other mechanical appliances. Dr. Tyler Smith is entitled to the credit of proving this point by success (*Med.-Chir. Trans.*, 1858). In a case of inversion of twelve years' standing he effected reduction by maintaining pressure upon the tumour and thus upon the os by an air-pessary during several days. Pridgin Teale (*Medical Times and Gaz.*, 1859) reduced an inversion of six months by the air-pessary in three days. Dr. C. West (*Medical Times and Gaz.*, 1859) by similar means reduced an inversion of a year's standing. Dr. Bockenthal (*Monatsschr. f. Geburtsk.*, 1860) succeeded in six days in reducing an inversion which had lasted six years. Mr. James Hakes (*Liverpool Med. and Surg. Reports,* 1868) by same means reduced a chronic inversion in fourteen days. Schrœder (*Berlin Klin. Wochnschr.*, 1868), thus reduced an inversion of two years. And latterly (1869), Mr. Lawson Tait, on my suggestion, effected reduction in the same manner. The last woman died; but her case was already desperate. Borggreve, indeed, had applied the same principle. He used a stem eight inches long with an egg-shaped knob which he fitted to the inverted fundus, and held it in gentle pressure by a T-bandage. In three days the uterus was returned. Dr. Marion Sims relates an interesting instance of the influence of constant pressure. A stem-pessary with an external support, after pressing for some days upon the inverted fundus, was found to be taken up into the inside of the re-inverted uterus, the os having yielded and allowed both to pass in together.

James P. White succeeded in reducing in the following manner: "Having succeeded in *dimpling* the fundus, pressure was maintained with the thumb at that point until the hand had become nearly powerless. To preserve this depression whilst the muscles of the hand were permitted to rest, a rectal bougie was carried along in its place, fixed in the dimple, and pressure unintermittingly continued through it, by the left hand outside the vulva. Gradually the concavity of the fundus was found to be deeper, until it finally became completely restored." In more obstinate cases he keeps up elastic pressure by means of a "Repositor" constructed as follows: it has a uterine extremity expanded and hollowed to receive the fundus of the uterus. The edge of this part is tipped with soft rubber; it is 1⅜-in. diameter, and half an inch deep. This is supported on a stem of wood slightly curved to answer to the curve of the vagina, and this stem has attached a coil of steel wire. In use the hand is passed into the vagina; the uterine cup of the repositor is then adapted to the fundus, where it is held by the hand. The coil is then pressed against the breast of the operator, keeping a pressure of about eight or ten pounds. Counter-pressure to prevent too great strain upon the vagina is made by the hand outside, so that the fingers dip into the inverted uterus (*Transactions of the International Medical Congress, Philadelphia,* 1876).

Courty (*Maladies de l'Utérus,* 1866) relates a case in which inversion had existed ten months, inducing repeated hæmorrhage and extreme debility. He reduced it in the following manner. The uterus was dragged outside the vulva by Museux's vulsellum; then, the index and middle finger of the right hand were passed into the rectum, and hooked forward over the neck of the uterus; then the uterus was seized with the left hand, and passed back into the vagina; still holding the neck hooked down, the fundus of the uterus was turned so as to look forwards to the pubes, the neck turned to the sacrum. The fingers in the rectum separating, rest firmly in the angular sinuses formed by the utero-sacral ligaments; then the thumb and index of the left hand pressing on the pedicle of the tumour gradually increase the depth of the utero-cervical groove. The two hands acting thus in concert, the uterus was reduced without violence in a few minutes. He had failed with the air-pessary; the patient could not bear it. He cites Barrier (*Bull. de l'Acad.,* 1862) as having reduced a case of fifteen months' standing, who found a *point d'appui* by pushing the neck of the uterus against the sacrum. Dr. Emmet (*Amer. Journ. of Med. Sci.,* 1866) succeeded in the following manner: he passed his hand within the vagina, and whilst the fundus uteri rested in the palm, the five fingers were made to encircle the portion within the cervix, as near as possible to the seat of inversion; whilst the portion was thus firmly grasped, it was pushed upwards, and the fingers were immediately afterwards expanded to their utmost. This manipulation, with the aid of the other hand over the abdomen, was persevered in until the fundus had passed within the os uteri. The advance gained was in proportion to the amount of dilatation accomplished by the spreading of the fingers, thus increasing the transverse diameter of the uterus, and shortening its long diameter. When the reduction had so far advanced that the fingers could not be passed fully up to the seat of the inversion, steady pressure was applied to the fundus by the tips joined together, whilst an increased effort was made by the hand outside to roll out the parts by sliding the abdominal parietes over the edge of the funnel.

It has happened in several cases that only partial reduction could be effected; that is, the body would return through the cervix in a doubled form, the fundus still being depressed, and presenting just above the cervix. In such cases, continuous steady support by a cup-shaped pessary or the end of a stethoscope, may in time complete the restoration. This difficulty has been met in an ingenious way by Dr. Emmet. He effected the closure of the os externum by silver sutures, so that the fundus imprisoned in the cavity of the neck tends to dilate the constriction near the os internum. At a subsequent period the stitches are removed, and the taxis is practised again.

Dr. Emil Noeggerath, of New York, has described a method of taxis which deserves attention. "It consists in compressing the uterine body opposite to each horn, so as to indent one of these, and thus offer to the cervical canal a wedge, which passes up, and is followed rapidly by the other horn, and the whole body." Thomas reports that he has practised this manœuvre on two occasions with success.

From time to time a method which may be described as the *forcible taxis* has been employed. Of late years a proposition has been made, supported by several distinguished American physicians, to admit this method to a recognized place in the treatment of chronic inversion. The fact that death after rupture of the uterus or vagina has several times been the consequence of forcible taxis should alone be sufficient to discredit the method. No number of successes ought to outweigh failure so deplorable. Forcible reposition has been attempted either by the hand alone or by aid of a *repoussoir*, that is, some kind of blunt instrument of wood or ivory. Depaul (*Gaz. des Hôp.*, 1851) used a *repoussoir* in a case eleven days after labour. The patient died in a few days from rupture of the uterus. Laceration has also occurred in several cases in America.

It is true that success restores the woman to her former integrity, but the penalty of failure to return the uterus is not infrequently death. The part will not sustain more than a certain amount of violence without laceration; much force is necessary, and it is impossible to restrict with nicety the force employed within safe limits. Sustained solid or elastic pressure is free from the objections that surround the preceding methods. Success means restoration to integrity, and failure does not mean death or mutilation. It simply leaves the patient *in statu quo,* and in a condition to be treated with every prospect of success by the adjuvant method of cervical incisions to be presently described. This method of forcible taxis has been confounded with that of gradual reduction by sustained elastic pressure. The principles of the two procedures are totally opposite. One tries to overcome resistance by sheer force rapidly applied, the other by wearing out resistance by gentle pressure long sustained. The first is replete with danger, the second almost absolutely safe.

A method of effecting reduction remarkable for its boldness has been put in practice by Professor Thomas. This consists in making an incision through the abdominal wall so as to get at the constricted os uteri from above, and then applying a dilating force. The idea was enunciated by the late Sir James Simpson at the discussion of my paper before the Medico-Chirurgical Society in 1869. A case in which it was carried out by Thomas is thus described: An assistant introduced his hand into the vagina, and "lifted the uterus so that I could detect the cervical ring against the abdominal wall. I then slowly cut down upon the median line, as for an exploratory incision in ovariotomy, and leaving the wound exposed to the air until all oozing had ceased, cut into the peritoneum. I then inserted my finger into the uterine sac, and found no adhesion whatever to exist. Replacing the assistant's hand by my left hand, I now inserted the steel dilator and dilated the stricture. (The dilator is constructed on the principle of a glove-stretcher, R. B.) The dilatation was exceedingly easy and rapid, but I found that as I withdrew the dilator, the tissue of the organ would at once contract. After dilating the stricture fully, I partially returned the uterus. . . . Drawing it down to the vulva, I rapidly pushed it up, and was gratified at finding that it was nearly replaced. Drawing it down again, this time outside of the body, to my dismay I discovered that the artery cut one week before was spouting freely. . . . I rapidly returned the organ, and was delighted to find one horn rise into place. But the additional force employed was a little more than the vagina could bear, and one finger passed through between the uterus and the bladder. One horn was still inverted. Passing the dilator into this, I stretched it open, and instantly the uterus resumed its normal position. The artery bled freely that day into the vagina and into the peritoneum through the vaginal rent. But the patient ultimately recovered." Dr. Thomas operated in the same way in another case. "She did perfectly well for forty-eight hours, but at the expiration of that time peritonitis developed itself, and proceeded to a fatal issue."

Reflection upon these cases will hardly, I think, justify the recommendation of Dr. Thomas. In the first case, even after dilatation of the cervical ring, so much force was necessary in taxis as to rend the vagina; whilst in the second, fatal peritonitis was the result. A method which requires gastrotomy for its execution, involves conditions of danger so great that even amputation seems preferable.

Amputation may be likened to cutting the Gordian knot. It is an apt illustration of John Hunter's aphorism. It is a confession of impotency to solve the problem of reduction. It is the last resource; one to which I am firmly convinced we need hardly ever, if ever, be driven. Notwithstanding the histories of a considerable number of cases of recovery after the operation, it cannot be said to take rank as a scientific proceeding.

The conditions of safety depending upon Nature may be absent, and the surgical means at present known are imperfect. When the uterus is cut across at the neck, of course a hole is made opening from the fundus of the vagina into the peritoneal cavity. The danger of fatal peritonitis is great. The shock of the operation also is serious. Hæmorrhage is likely to ensue, and some blood will escape into the abdomen. There are various methods of performing the operation. The uterus has been seized by a vulsellum, drawn down, and the cervix cut through with a knife. Next, it was thought that the ligature applied to strangle and to slough through, as in the case of a polypus, would be less dangerous. Treated in this way the result has been varied. In several instances, where a whipcord ligature has been applied by Levret's or Gooch's double canula, agony so intense has been produced, as to render it necessary to remove the ligature, and the patient has died notwithstanding. The cause of the excruciating pain is, I believe, the compression of the included Fallopian tubes. I have observed the same pain in cases when the tubes have been tied in the pedicle of an ovarian tumour. And it has been observed in several cases that the surface and substance of the uterus proper was nearly insensible, pain being developed only on tightening the ligature. In some cases the patient has died with the ligature attached. There is a preparation illustrating this in the museum of St. Bartholomew's Hospital, death ensuing from peritonitis eight days after tying. On the other hand, it seems not unreasonable to hope that a ligature gradually tightened may set up adhesive inflammation in the neighbouring peritoneum, and thus shut off the abdomen from communication with the vagina when the uterus falls away. Certain it is that this hope is not always realized. Thus McClintock relates a case in which a ligature was applied during eighteen days, occasionally relaxing it on account of the severity of the pain, before the uterus was separated. No peritoneal adhesion had taken place; the woman, however, made a good recovery. In eighteen cases where the time that elapsed before the uterus fell is stated, the ligature took from nine to twenty-eight days to sever the parts. The average time was seventeen days.

It has been remarked that the ligature has arrested the hæmorrhage. Dr. Ramsbotham has related a case in which the ligature had to be removed at the end of twenty-four hours, owing to symptoms of violent peritonitis; but the profuse sanguineous and mucous discharges ceased.

J. G. Forbes (*Med.-Chir. Trans.*, vol. xxxv.) suggests that the simple application of a ligature around the neck of the tumour to destroy its vitality appears to possess more advantages than the other modes of operating.

McClintock relates two cases in which strangulation was first effected by a ligature for four days, and then the uterus was removed below the ligature by the chain-écraseur. The patients recovered. This combined method seems likely to unite most conditions of success. Dr. Marion Sims relates (*op. cit.*) a case in which after vain attempts at reduction, and being compelled by the consequent pain and prostration to abandon the ligature, he resorted to the chain-écraseur. When the parts were all divided except the right broad ligament, "all at once the most fearful hæmorrhage he ever encountered took place." It was happily stopped by passing the finger into the abdominal opening and compressing the source of the hæmorrhage. The blood which had escaped into the peritoneal cavity was sponged out, and the divided edges of the cervix were united by five or six silver sutures. The patient recovered. Mr. Baker, of Birmingham, relates (*Brit. Med. Journ.*, 1868) a case of recovery after amputation by the chain-écraseur. The bleeding vessels were sealed by actual cautery. Dr. Hall Davis relates (*Obstetrical Transactions*, 1873) a case in which he amputated the uterus ten months after labour. He used the single wire écraseur. He employed it without first dragging upon the neck of the uterus, expecting thus to lessen the risk of the sudden springing up into the peritoneal cavity of the severed cervical portion of the uterus. No hæmorrhage occurred. The patient recovered. Pain was subdued after the operation by subcutaneous injection of morphia every six hours during the first twelve days, it being found that any suspension of its use was followed by severe uterine and ovarian pains. The pulse was very small immediately after the operation, and the temperature fell to 97° F. It appeared that in this case there were peritoneal adhesions, a condition which, no doubt, supplied a safeguard against peritonitis, and which, as it would have rendered reduction impossible, justified the recourse to amputation. Professor Barba (*Il Morgagni*, 1872) amputated an inverted uterus of three months' standing by Chassaignac's écraseur. There was no great bleeding; but syncope set in immediately, and lasted seven hours. This was followed by peritonitis, which subsided in fourteen days. The patient recovered.

Dr. Valette (*Lyon Médical*, 1871) relates a case of successful amputation by means of a clamp, each blade of which was grooved to carry chloride of zinc paste. The neck of the tumour being seized in this caustic clamp, the uterus was cut off in front of it, and the stump cauterized with chloride of zinc. The actual cautery would give greater security against hæmorrhage. The preceding histories will show some of the dangers attending amputation, and how they may best be encountered. In those rare cases where adhesions or extreme exhaustion forbid the attempt to reduce, the best method of amputation appears to be by the wire-écraseur. The induction of anæsthesia is of course indispensable. Were I compelled to resort to this *ultima ratio,* I should, before amputation, transfix the neck of the tumour by a needle carrying a wire suture, so as to command the divided edges of the opening, and facilitate the application of the cautery to the bleeding surface. The use of the galvanic cautery wire to effect the amputation seems to possess advantages over the other forms of écraseur.

In cases where neither reduction nor ablation can be attempted, hæmorrhage and other discharges may be restrained by lotions of tannin, alum, perchloride or persulphate of iron, or of carbolic acid; and probably some advantage may be derived by compressing the uterus by wearing an air-pessary in the vagina.

In my memoir in the *Medico-Chirurgical Transactions*, 1869, I gave a summary account of the results which had attended the various modes of operating in the cases which I had then been able to collect. Further research, and the records of subsequent histories, some of which are referred to in the preceding paragraphs, involve some modification of the conclusions then arrived at. But the practical lessons flowing from this summary are still valid.

"Six different modes of dealing with *chronic inversion* have been tried with the following results in the cases I have been able to examine.

"I. By ligature alone. Of these twenty-six were successful, ten unsuccessful. Of the unsuccessful eight died, and two recovered without extirpation.

"II. By ligature and excision: nine were successful, three unsuccessful. These three all died.

"III. By excision simple: three were successful, two died.

"IV. By sustained solid pressure there have been several successful cases.

"V. By sustained elastic pressure in eight cases the uterus was restored, in seven of them recovery was perfect, one died, being already beyond hope. In three or four cases reported, the pressure was given up.

"VI. By forcible taxis: six successful cases are reported; four failed, all of them dying."

In appreciating the relative merits of these different operations it must be remembered that the highest success attained by ligature or excision is achieved at the cost of mutilation; the woman is unsexed; and failure commonly means death.

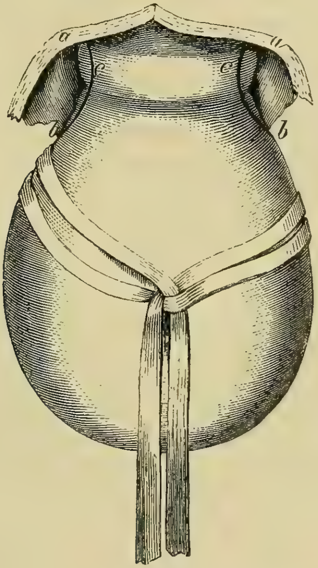

Fig. 147.—Dr. Barnes's operation.

SHOWING INVERTED UTERUS DRAWN DOWN BY TAPE-NOOSE (R. B.).

a b c. Line of incisions in the cervix.

The Author's Operation.—The following passage is quoted from my memoir above referred to: "Another proceeding stands before amputation. For twenty years I have taught in my lectures that the unyielding cervix may be divided by incisions carried into its substance from above downwards at different points of its circumference. Pressure then applied will cause it to yield more easily. Huguier, Professor Simpson, and Dr. Marion Sims have suggested the same plan.

"I am not aware that it had ever been carried into execution before 1868, when I treated a case in this manner with complete success. The inversion was complete; it had lasted six months; the patient was so prostrate from continuous discharges that the prospect of her holding out many weeks was small. I first tried to re-invert by keeping up continuous elastic pressure during five days, with occasional attempts by taxis as recommended by Tyler Smith. This failing, I drew down the tumour to the vulva by passing a sling-noose of tape round it, thus putting the neck on the stretch (see Fig. 147); I then made three incisions in the neck about a third of an inch deep, one on each side and one behind in a longitudinal direction, that is, across the fibres of the cervical sphincter. Then, compressing the uterus with my left hand, and supporting the os uteri by the fingers of the right hand through the abdominal wall, I found the cervix yield, and the body went through into its place. The cervix yielded by laceration extending from the incisions; and I very much feared at the time that serious if not fatal mischief had been done. No material inconvenience, however, followed; and examination three weeks afterwards showed the cervix and uterus to be in their proper places. Notwithstanding the successful issue, I believe that the method should only be resorted to after a full trial of Tyler Smith's plan, and then with great caution. I should recommend that only two incisions be made, one on each side of the os, and these of moderate depth. The re-inversion should be trusted to sustained elastic pressure."

This suggestion I have since had the good fortune to carry out with complete success (see *Obstetrical Journal*, 1873).* The first woman has had two children since the operation. Dr. William A. Wilson records (*Lancet*, 1877) a case in which inversion had lasted probably nine months. Having tried sustained elastic pressure during a fortnight without effect, he incised the neck according to my method, and reduction was effected easily, "with a distinct feeling of tearing of the uterine tissue." There was very little hæmorrhage. Recovery was perfect. W. G. Kemp, of Wellington, New Zealand, relates a case (*Obstetrical Journal*, 1875) of inversion of five years' standing. He carried out my method, and effected reduction without hæmorrhage or laceration.

Professor Thomas reports a case in which he incised the cervix as follows (*Diseases of Women*, 1872): In June, 1869, attempts by taxis having failed, "I pushed the uterus as far as it would go; thus fixing by my finger the point of constriction, I drew it down, and cut down through the neck, the incision first involving the mucous membrane, and extending down toward the subjacent peritoneum, as recommended by Aran. No sooner was the knife withdrawn than a free jet of blood was projected from an artery which appeared nearly equal in size to the radial. This jet was not *per saltum,* but steady as it is often seen to be from small arteries located in dense fibrous tissue. For half an hour we strove to ligate this. Upwards of a dozen ligatures were one after another applied, but the vessel had retracted into the brittle tissue of the uterus and could not be tied. The flow was at last checked by passing a suture through both of the wounds and bringing them forcibly together." This is the case which was completed by Thomas's plan as described at page 737.

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* "On a New Method of Reducing Chronic Inversion of the Uterus."

Dr. Duncan (*Edinburgh Medical Journal,* 1877) does not regard the condition of the cervix as of any importance. He thinks the difficulty in reduction lies in the body of the uterus. He accordingly treated one case by incision from the internal os to the middle of the body as deeply as could be done without injuring the peritoneum. One incision was made in front, one behind. Blood flowed freely in jets. Then taxis was applied, and partial reduction was effected, sensible free laceration of tissue attending. This reduction was afterwards completed, and the patient recovered. I cannot, reflecting on my own experience, accept Dr. Duncan's opinion that the cervix is not concerned in the obstruction to replacement. It is possible that partial reduction in his case was facilitated by the lessened bulk of the uterus through the free bleeding. No bleeding to cause anxiety occurred in my cases.

The application of sustained elastic pressure requires care and watching. The distress, even pain, occasioned by the continuous distension is severe; and in several cases it has been felt necessary to abandon the method. To obviate this difficulty, the pressure may be occasionally relaxed; and we may have recourse to chloral or the sub-cutaneous injection of morphia. The proceeding undoubtedly requires steady perseverance and some skill in adjusting and regulating the pressure. But these conditions given, success will rarely be wanting.

The best time for attempting reduction.—Sometimes, as when the symptoms are very urgent, we have no choice. But where the opportunity is given, it would, I think, be better to work between the menstrual epochs, observing the general rule to avoid operations during menstruation. Malgaigne, however, preferred a menstrual period on the ground that at this time the tissues are softer and more yielding.

In my second case I used the elastic pessary (Fig. 148). It consists of a fixed stem made to fit the pelvic curve, and surmounted with a cup-shaped disk of hollow rubber which receives the inverted uterus. At the end of the stem, which is outside the vulva, are attached strong rubber bands which are brought up before and behind to be attached to an abdominal belt. By means of these bands the difficulty of maintaining steady pressure, which occurs when inflated bags are used, is entirely obviated. By tightening or relaxing these bands it is easy not only to regulate the pressure to a nicety, but also to give it the exact direction we want. For example, by bracing up the posterior bands we throw the force forwards, and may spend it directly upon the neck of the tumour. Thus dragging upon the ring of reflection, there is kept up a constant eccentric pull tending to open the constriction. The pressure upon the body of the uterus at the same time tends to squeeze out the blood and serum from its tissues, diminishing its bulk and arresting hæmorrhage. Counter-pressure should be exerted by pads to the abdomen supported by a firm binder.

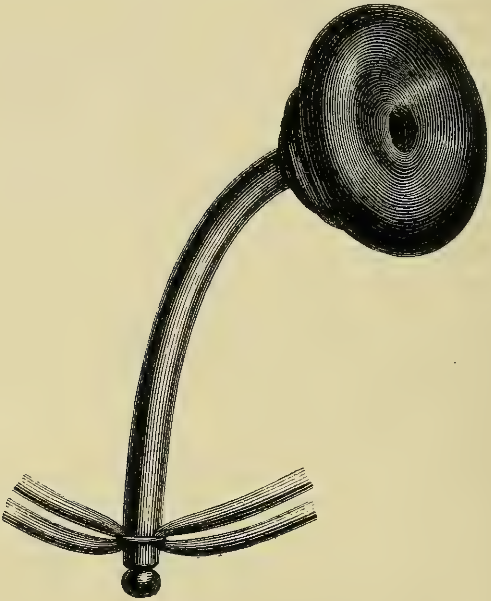

Fig. 148.

DR. BARNES'S ELASTIC PESSARY FOR REDUCTION OF CHRONIC INVERSION OF THE UTERUS (R. B.).

Once a day, or every other day, the instrument may be removed, and, under chloroform, an attempt at reduction by taxis may be made. For this purpose one hand should be passed into the vagina, whilst the other hand applied above the pubes exerts counterpressure upon the funnel-like ring of the inverted organ. The fingers grasping the neck of the tumour, alternately compressing and pushing at the circumference, we persevere either until we feel the ring expanding and a part of the mass going through it, or until fatigue or the condition of the patient warn us to desist. In the latter case we readjust the elastic pessary. In the former case the reduction is commonly effected at last suddenly; we feel the fundus go into its place with a jerk. The restored cavity of the uterus should then be swabbed with a solution of iron, and the patient left to rest.

When well adapted and steadily pursued attempts to reduce have failed, and the patient's life is threatened, then only shall we be justified in resorting to the *anceps remedium* of amputating the offending organ.

When attempts at reduction have failed, the operators have in some cases been too ready to conclude that the cause of failure lay in adhesions. But it is remarkable how seldom this conjecture has been borne out by facts. The truth is that adhesions are extremely rare. It has even been difficult to produce them by proceedings directed *ad hoc* in order to obviate some of the dangers of amputation. The possibility then of adhesions opposing reduction may be practically disregarded if gradual elastic pressure be employed.

Professor White sums up his experience of twelve cases: "The result has been in all the cases encountered, restoration by manipulation on the first trial, and as is believed without serious injury to the tissues, thus confirming the conviction that all cases are curable, irrespective of their duration."

CHAPTER XXIV.

TUMOURS OF THE UTERUS: MALIGNANT AND NON-MALIGNANT; FIBROID OR MYOMATOUS; STRUCTURE OF UTERINE TUMOURS; SEAT; SHAPE; DENSITY; VASCULARITY; LAW OF GROWTH; CONVERSION OF MUSCULAR INTO FIBROID TUMOURS; PROCESS OF EXPULSION, FORMATION OF POLYPUS; FLESHY AND FIBRO-CYSTIC TUMOURS; RECURRENT FIBROID; ERECTILE; DEVELOPMENT AND DECAY OF FIBROIDS; FATTY DEGENERATION; SOFTENING; CRETIFICATION; INFLUENCE OF FIBROIDS ON UTERUS, SURROUNDING ORGANS, AND SYSTEM GENERALLY; ENLARGEMENT, DEFORMITY, DISPLACEMENT OF UTERUS; DYSMENORRHŒA, METRORRHAGIA, STERILITY; ATROPHY OF UTERUS; ULCERATION, PERFORATION; PRESSURE UPON SURROUNDING ORGANS; PAIN; PHLEGMASIA DOLENS, PERITONITIS; SYMPTOMS AND DIAGNOSIS; TREATMENT.

ALIKE for pathological and clinical study, new growths or tumours in the uterus may be divided into malignant and non-malignant. Although there are forms of transitional character which it may be difficult to refer with absolute certainty to one or the other class, it is still convenient to observe this distinction as far as we can. Thus I propose to devote the present chapter to non-malignant tumours, and another to the malignant diseases generally associated under the common name of "cancer."

Non-malignant tumours are classified first, according to their histological characters; secondly, according to their seat or other clinical characters. It may be stated as a proposition generally true that non-malignant tumours affect the body of the uterus, and malignant growths affect the cervix. But in accepting this statement we must be careful in practice not to forget that there are many exceptions. In most cases the seat of the tumour, malignant or non-malignant, exerts a material influence upon the clinical history, and often influences treatment.

For clinical purposes Atlee (*Trans. of International Med. Congress, Phila.*, 1876) divides fibroid tumours into those which are usually accompanied by hæmorrhage and those which are not.

Fibroid Tumours.—There is perhaps no organic change in the uterus more common than the development of tumours of this character. The statement of Bayle that 20 per cent. of all women dying after the age of thirty-five have fibroid tumours in the uterus is always quoted in reference to this point; and Klob, a more recent writer, says, "Undoubtedly 40 per cent. of the uteri of women who die after the fiftieth year contain fibroid tumours." Although unable to oppose these statements with numerical deductions, I venture to doubt whether the frequency of this affection is so great as these figures would indicate. Admitting their approximate accuracy, two conclusions are sufficiently justified. First, in a large proportion of cases fibroid tumours in the uterus occasion no marked distress, and entail little danger to health or life; secondly, they occur with increasing frequency with the advance of age until the climacteric is reached. I do not know that it has ever been clearly made out that fibroid tumours originate after the climacteric. Undoubtedly they may grow after this epoch, and that very rapidly, but the time of their formation is mainly, if not absolutely, limited to the period of sexual activity. My American friends tell me that fibroids are especially common in negro-women. Virchow says they are comparatively rare in women who have borne children, and more common in old maids.

Cruveilhier called attention to the remarkable affinity of the uterus for these fibroid bodies. It must also be borne in mind that similar tumours form wherever there is muscle resembling that of the uterine wall. Thus they are found in the broad ligament, and in the vagina. Although far more frequent in the body of the uterus, where the muscular element preponderates, they occasionally arise in the cervix. Indeed there is a form of fibroid degeneration which seems especially to affect the cervix, producing thickening of some portion of its wall, generally the anterior. This form, however, is not identical with the common fibroid; it is not distinctly capsulated. But tumours in all respects resembling the true fibroids do occur in the cervix. Thus Professor Faye (*Christiania*, 1866) relates a case of unusually large fibrous tumour growing from the anterior lip of the vaginal-portion. I have seen several such cases assuming a polypoid condition. I have also removed several from the vagina quite separate from the uterus. Dr. Höning (*Berlin Klin. Wochenschr.*, 1869) relates the case of a woman aged forty-one, who suffered from dysuria and bowel-obstruction. A tumour the size of the fist projected from the genitals; it sprang from the left side of the urethra. A still larger tumour was contained in the vagina. The mass was a "soft fibroid."

The Structure of Uterine Tumours.—The various names given to these growths attest the varying ideas that have been current as to their nature. Morgagni and Baillie called them "hard tubercles;" Hooper, "sub-cartilaginous;" then they were called "fibrous;" to this name succeeded the one in common use, "fibroid," or "fibroma." In older writings the term "scirrhous" is often used. Some insist that "myoma," and "fibro-myoma" are more correct designations, whilst Broca regarding the similitude of their structure with that of the uterus, proposes the name "hysteroma." Cruveilhier observed that there were "hard polypi, which consisted in hypertrophy of the tissue of the uterus—such is the one figured pl. vi. liv. xi^e of his work—and others consisting of fibrous bodies developed under the uterine mucous membrane." He thus describes the structure of this polypus: "The figure represents an antero-posterior section of the polypus and of the fundus of the uterus. The tissue of the polypus is seen to be continuous, without any line of demarcation, with the proper tissue of the uterus; it is a prolongation of this proper tissue, and not a fibrous body developed in the thickness of the uterus, capable of being separated by enucleation. The identity between the tissue of the uterus and the tissue of the polypus is such that the closest examination does not reveal the slightest difference."

Cruveilhier does not appear to have suspected that the ordinary fibroid tumour, distinctly defined from the proper uterine tissue, and capable of enucleation, might also consist of muscular fibre in every respect resembling the muscular fibre of the uterus.

Vogel* demonstrated the essential identity of structure of the "fibrous" tumour with that of the muscular wall of the uterus in which it takes its origin. One case (Fig. 8 in Vogel's work) exhibits the "mature fibres of a fibrous tumour of the uterus found in the body of a woman who died of puerperal fever. In the fundus uteri two tumours of the size of almonds were found projecting under the peritoneum. They consisted of parallel fibres, forming a thick, very dense, milk-white tissue. The fibres became pale, and gradually dissolved in acetic acid; most of them were long, spindle-shaped cells, which were not affected by acetic acid. The normal substance of the uterus consisted of like fibres, resembling in every respect those of the two tumours."

I have cited the above passage because the observation it refers to was made upon a puerperal uterus. In 1844 (*Guy's Hospital Reports*) Oldham describes the constitution of a polypoid mass which was driven down by the uterus after labour: "The prevailing tissue was a clear unstriped fibre, which, when examined with a portion of the muscular fibre of the uterus, differed only in the latter being more full of cells and blood-corpuscles, which rendered its definition as fibre less distinct than the former."

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* "Erlaüterungstafeln zur pathol. Histologie," 1843.

I had an opportunity, in conjunction with Dr. Hassall, of verifying this identity of structure between fibrous tumours and uterus in the non-pregnant state. (*Lancet*, vol. i. 1851.) Lebert, in 1852, describes these tumours as consisting of—1. Cellular tissue and fibro-plastic elements; 2. Muscular fibre-cells like those of the uterus; these come out clearly with acetic acid. In 1853, Bristowe reported to the Pathological Society the result of his examination of two fibrous tumours. Robin says "the muscular fibre-cells are larger than those of the empty uterus, but smaller than in the gravid womb; that they constitute from one quarter to one half of the morbid mass; that there is also a large proportion of finely granular amorphous matter, very tenacious, half solid, binding the fibres of the cellular tissue, and also the fibre-cells together." The granular amorphous element tends to increase in proportion to the rapidity of the growth of the tumour. I am indebted to Mr. Henry Arnott for the illustration of the structure of the uterine fibroid or myoma, Fig. 149, p. 750.

The similarity of constitution, then, of "fibrous" tumours with that of the muscular wall of the uterus in which they originate is now amply determined. But I think this similarity is somewhat overstrained. At any rate we must distinguish two forms, the hard and the soft tumours. I am glad to find this opinion confirmed by Sevastopulo, who represents the views of Broca (*Des Hystéromes, Paris*, 1875). "Hard myomas," he says, "are chiefly or wholly formed of fibrous elements, so that the name myoma would be quite improper if it were not known that the fibrous element had been gradually substituted for the muscular, and had in a way choked it. Soft myomas, on the other hand (Virchow), are almost entirely constituted of muscular elements. They occur in younger women than the hard." We do, indeed, find the same histological elements; but certainly they are combined in different proportions, so as to produce marked differences in some of the physical characters. For example, the "fibroid" tumour is commonly pearly white, more striated, under the knife it gives a different sensation; compared with the uterine wall in which it is imbedded, its density and feel are different; its interior is less vascular; it behaves in short in many respects as a foreign body. It is true that in the pregnant uterus it follows to some extent the same laws of development and of involution as the muscular wall; but even in this circumstance, remarkable differences are occasionally observed, especially in the course of involution. The fibroid tumour being less one with the uterine wall, being less vascular, does not always follow *pari passu* the retrogression of the proper muscular tissue. It sometimes remains larger. And sometimes, having less vitality, less power of resistance to injury, it passes into a state of low inflammation, or necrosis, which leads to its death, entailing either total disappearance by absorption, or the spread of inflammation to the proper structures of the uterus, and pyæmia. This is especially liable to happen when such a tumour being situated in the lower zone of the uterus is exposed to unusual contusion by the passage of the head during labour.

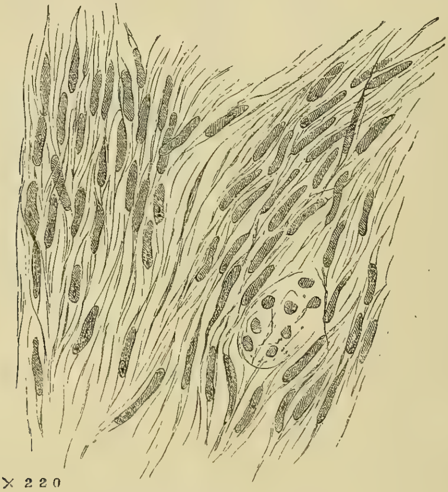

FIG. 149.—(Ad nat., by H. Arnott.)

STRUCTURE OF FIBROID OF UTERUS.

Showing structure of waving bands of the long spindle-cells, with rod-shaped nuclei of plain muscular tissue; the nuclei stained with carmine. At one point a few cells divided transversely.

Looking at the histological characters of fibroid tumours we may imagine them to arise from accidentally aberrant growths of points of the original muscular structure of the uterus, that get surrounded by connective tissue or the regularly disposed muscular fibres, and thus become isolated in masses instead of being disposed in strata in the general structure.

The *seat* of fibroid tumours varies infinitely. Beginning in the substance of the muscular wall, they are all at first *interstitial.* As they increase in size they tend to bulge out either on the outer or inner surface of the uterus. In the first case they are called *sub-peritoneal;* in the second, *sub-mucous.* They are far more common in the body of the uterus than in the neck. This may be accounted for by the lesser proportion of muscular fibres in the neck.

In *shape* fibroids vary greatly. All are at first probably rounded, and whilst single and of moderate size they generally remain so. The irregular nodulated tumours are mostly conglomerates of many nuclei growing together at different rates. When the tumours are separate, they may by mutual compression assume various shapes.

In *density* they vary according to the stage of development from soft elastic to nearly cartilaginous. In *colour* they vary from red to nearly pearly white.

Vascularity.—An important point in the constitution of fibroid tumours of the uterus is their *vascularity.* Cruveilhier observed that "it is in these bodies that the vascular system of fibrous bodies in general can best be studied. A considerable vascular network envelopes them; this is entirely venous; it communicates largely with the veins of the uterus, which have acquired a calibre proportioned to that of the volume of the fibrous bodies, and to the development of the uterus. On the other hand this venous network receives all the veins which arise in the substance of these bodies. No uterine artery has appeared to me to penetrate the fibrous bodies whose circulation is reduced to its most simple expression; no lymphatic vessel has been demonstrated; no uterine nerve has been traced into them. Hence the absolute insensibility of these bodies." But Virchow and Oldham have demonstrated large vessels in some tumours. They are more marked in the soft fleshy tumours; and vascularity diminishes as they become more fibrous.

When a tumour is sub-mucous or polypoid, its mucous investment exhibits evidence of greater vascularity than is proper to the healthy membrane. When a ligature is put on such a tumour the vessels being strangled become gorged, dark-red and easily bleed. When seized by vulsellum, ecchymosis is produced from the rupture of small vessels; but this appearance is chiefly seen in the capsule of the tumour; deeper in the substance the tissue even under section shows little sign of blood-vessels being divided. There is, however, an injected specimen in St. George's Museum (xiv. 65) which shows the injection throughout the substance. It appears to be a true fibroid. In St. Bartholomew's is a specimen (32.12) showing "several tumours in the uterine wall. The vessels of the uterus have been injected, and the injection has entered the tumours." Examination of this specimen will, however, show that this is true chiefly of one large tumour near the inner surface of the uterus, and of looser texture; and that this tumour is less vascular than the uterine wall itself, whilst two smaller tumours, sub-peritoneal, are scarcely injected at all. In another specimen in the same museum (32.6), "a section of a uterus, with a firm fibrous tumour imbedded in the middle of its anterior wall, the vessels are minutely injected; but none of the injection appears in the morbid growth." This remains white in remarkable contrast with the vascular uterus.

This comparative absence of vessels, and the consequent low vitality, accounts for the impunity with which these tumours can be cut or lacerated during surgical operations. The venous character of the blood-vessels on their surface explains the free hæmorrhages occurring whilst they retain their relations, and the speedy cessation of the bleeding when the tumours are removed.

But in some cases there exists a largely-developed net-work of blood-vessels surrounding the tumour and in connexion with it. Large sinuses are formed. This constitutes a serious danger in enucleation—1, of hæmorrhage; 2, of septicæmia. The danger is all the greater that we cannot discover before operating the presence or absence of such vascular relations.

The *rate of growth* is hard to determine. It is not uniform. It is governed greatly by the ovarian stimulus. Probably the intramural or sub-peritoneal tumours grow more slowly than the sub-mucous. Many are comparatively small and inert for many years. That their usual rate of growth is slow may be inferred from their structure, which is but scantily supplied with blood-vessels; from the fact that fibroid tumours of considerable size are rare in young women; and in many it is a matter of observation. I have several women under observation in whom the existence of fibroids in the uterus was established many years ago. It is almost exclusively in women approaching or after the climacteric that very large tumours are seen.

Fibroid tumours are *single* or *multiple,* and some tumours apparently single are really *compound, that is, conglomerates of single tumours.* The characteristic of a single tumour is that it consists of one bundle or mass; in the case of multiple tumours there are two or more masses situated apart from each other in distinct parts of the uterus; whilst conglomerate tumours consist of several masses packed together in close approximation.

There is scarcely a limit to their *number.* In *size* they vary from a pin's head to that of a man's head, or even bigger.

Examples of the single and multiple tumours are seen in Figs. 150, 151, 152, 153, 154.

Fig. 150, taken from a specimen in St. Thomas's Museum, is a beautiful illustration of the conglomerate form. Each constituent mass appears surrounded in a separate matrix, whilst all are encapsuled in uterine tissue.

Change of Character or Conversion of Muscular into Fibroid Tumours.—Sevastopulo says all fibrous tumours are in origin muscular; that size is no evidence of age; that texture is determined by age. If old, side by side with primary muscular elements there will have been developed masses more or less con-

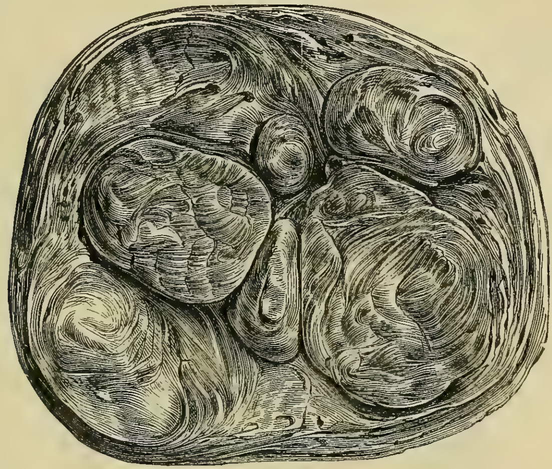

Fig. 150.—(Two-thirds nat. size, St. Thomas's Hospital.)

CONGLOMERATE OF FIBROID TUMOURS OF UTERUS (R. B.).

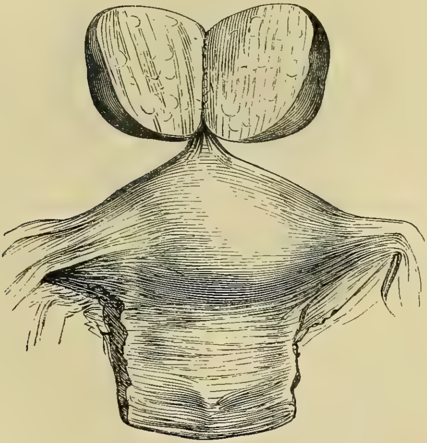

Fig. 151.—(Half-size, London Hospital.)

SUB-PERITONEAL FIBROID TUMOUR OF UTERUS (R. B.).

The tumour is only attached by a thin pedicle to the fundus uteri.

siderable of cellular tissue, a remarkably tenacious amorphous substance; and these last parts will have gradually strangled the first elements.

Law of Growth of Muscular Tumours and Polypi.—The mode of growth of these tumours, by the development of unstriped muscular fibre from nuclei, is sufficiently shown by the descriptions and figures of Professor Vogel. But, whilst their histological formation seems to be similar to that of the true uterine tissue, they appear to enjoy a certain amount of independent developmental force. This is proved by their greater comparative rapidity of growth, and by the fact that they sometimes attain a very large size in the unimpregnated uterus—that is, during a time when the uterus itself scarcely enlarges at all, or only so much as may be attributed to the morbid stimulus imparted by the presence of the tumour. At the same time it is worthy of remark that fibrous tumours are very rarely found before the age of puberty; when they exist, they remain passive until the period of activity of the generative system. After the child-bearing period, and the cessation of menstruation, fibrous tumours previously existing exhibit a marked tendency to recede. It is,

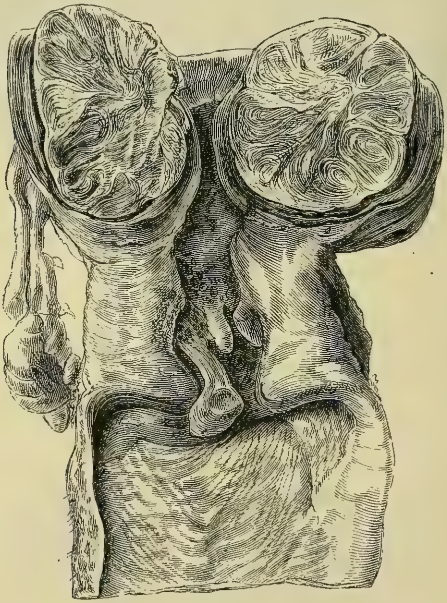

Fig. 152.—(Two-thirds nat. size, St. Thomas's Hospital.)

FIBROID TUMOUR OF THE UTERUS (R. B.).

Showing encapsulation in the proper uterine tissue, and attendant formation of cystic polypi in the cervix. The tumour starts from its capsule on section being made.

I believe, a very rare occurrence to observe that any fresh tumours become developed after this epoch. The period of active growth of fibroid tumours and polypi is the period of functional activity of the generative organs. The periods of greatest activity of growth of these tumours are the periods when the generative organs exhibit the greatest activity. The periodical stimulus the uterus undergoes at the epochs of menstruation is shared by the tumours lodged within its walls. The rapid enlargement of the uterus during pregnancy is often attended by a commensurate growth of the tumours.

But, although it may be laid down as a general rule, that fibroid tumours do not continue to grow after the termination of the normal period of menstruation, it must be admitted that exceptions occur. I have even observed that the constitutional ferment which frequently attends this critical period of life seems to determine in the temporary exacerbation of any form of uterine disease existing at the time. The organic force which had hitherto been exerted in healthy physiological work, is now diverted into a morbid channel. In this way these tumours not infrequently acquire an enormous size, equalling or even exceeding that of the gravid uterus at term.

The processes by which fibroid tumours are spontaneously expelled from the uterus deserve careful study, since it is on the right intelligence of these, that the artificial methods of enucleation and extraction must find a rational basis.

Both the sub-peritoneal and the sub-mucous tumours seem to be constantly pressing towards expulsion. The first step in this effort is seen in *bulging* or *projection* on the surface; the second is seen in *pedunculation*, when they are called *polypi;* the third is actual *detachment* from the uterus. The process of extrusion, a very important point in the clinical history of these growths, deserves attention. It may be likened generally to labour. The tumour is a parasitic growth which, drawing its means of nutrition from the uterine wall, and stimulating the structure in which it grows to increased development, may be said to produce in the uterus a state analogous to pregnancy. The uterus enlarges, its muscular element increases, and consequently its contractile property is called into play. The uterus thus developed tries to get rid of its parasites. Contractions of its muscular coat act upon the tumour and drive it towards the nearest surface, that is, the tumour is made to project at that part where the investing wall is thinnest. One of the conditions favouring this process is the difference in solidity between the tumour and the uterine wall. The texture of the tumour is usually more dense and compact, and is consequently less capable of contraction. It cannot follow or partake in the uniform contraction of the organ; as an unyielding body, preserving to a great extent its original dimensions, it must be driven towards one or other surface of the uterus as this diminishes in size. This liability to extrusion is the more especial characteristic of the dense fibroid encapsuled tumours. Those tumours whose texture more nearly resembles that of the uterine wall, which are continuous with this wall, show less of this tendency towards extrusion.

The expulsive action of the uterus is strikingly manifested in those cases in which the organ inverts itself in the effort to cast out a tumour. Cases of this kind are described in the chapter on "Inversion." They extend the similitude to labour.

In St. George's Museum is a specimen (xiv. 21) showing a fibroid in course of spontaneous elimination. The tumour is nearly detached as though a ligature had been applied.

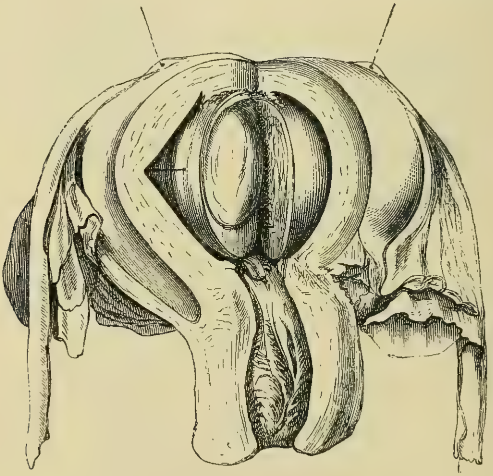

Fig. 153.—(Half-size, St. George's, xiv. 10.)

UTERUS WITH TWO LARGE FIBROID TUMOURS (R. B.).

One projects into the uterus, filling its cavity; it adheres to the inner surface of the uterus. The other tumour is at the back, towards the peritoneal surface, not seen in this view.

I believe, however, that the chief factor in extrusion is not always active uterine contraction. The ratio of growth is different. A dense body isolated from the uterine wall in which it is imbedded, and continuing to grow more quickly than the uterine wall, must soon form a projection upon the other surface of the organ. Thus it grows out of the uterus, rather than is cast out.

Sometimes the tumour is actually detached, and cast out from the body. Many cases of this method of *spontaneous cure by expulsion* are known. There appear to be two ways in which it is carried out:—1. The thin layer of proper uterine tissue which forms the shell of the tumour may become inflamed and give way; the tumour itself softening, may be broken up in such a manner that the fragments, not perfectly separated from each other, but preserving a slight connexion, may be driven down into the uterine cavity; or the tumour may come away entire, being, as it were, enucleated by the uterine action. This is especially likely to occur after labour. 2. The other way is by gradual pedunculation as explained. When the stalk is much thinned, the tumour breaks away by a slight force like an etiolated leaf or ripe fruit. 3. In some cases extrusion is preceded by inflammation and suppuration of the investing connective tissue; the natural bond of attachment of the tumour being thus broken down. Thus Dance relates a case in which, under this process, the tumour was so loosened as to float in its capsule, retained only by four slender pedicles.

Byford relates* some interesting examples of spontaneous expulsion, and cites others from Atlee and Parvin.

There is a feature in the process of extrusion which it is very necessary to remember. In many cases the part of the capsule nearest to the surface undergoes thinning to such a degree that the slightest force would complete perforation. The practical caution suggested is that when discussing operative enucleation, we should remember the possibility of such a condition.

The extrusion of fibroid tumours following labour is often attended by great danger. The tissue of the tumour, either through having suffered violence from compression or not, is very apt to be affected by a low necrotic form of inflammation which may give rise to metritis and pyæmia. And even when a tumour is expelled independently of labour, the process is not always carried out harmlessly. Thus, Cruveilhier relates a case of a young woman who had suffered during four months from uterine hæmorrhage, followed by a discharge horribly fœtid. At the end of this time she expelled some small masses, recognized to be fibrous tumours. The patient, whose health was undermined by hectic fever, and who presented all the marks of cancerous cachexia, recovered, contrary to all expectation, after the expulsion.

In St. George's Museum is a specimen (xiv. 20) "taken from the body of a lady who, on first consulting Mr. Stone, presented a tumour projecting from the uterus, and much resembling a polypus in the process of coming down. Severe pain came on, and the tumour began to project more, but never presented any neck. She sank exhausted by the discharge."

Sometimes the process simulates abortion so closely as to be mistaken for this event. This happened in the case of the wife of a medical friend. After profuse hæmorrhages and expulsive pains, a substance of the size and shape of a small hen's egg was passed. Both she and her husband believed she had aborted. But on making a section of the mass, I found it was a fibroid tumour. It is needless to say that such a series of events occurring in a single woman would almost infallibly give rise to imputation against her chastity. The history enforces the rule to submit every substance passed from the uterus to careful examination.

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* "Gynæcological Transactions," 1876.

The sub-peritoneal tumours may also become pedunculated, being the exact counterparts of uterine polypi. In proportion as the peduncle elongates, becoming more remote from uterine influence, they become less and less dangerous. I have known them to acquire a peduncle so long that the tumour could be grasped in the hand through the abdominal wall, and be moved freely about, only restrained by its mooring to the body of the uterus. When in this condition, the subject may go through pregnancy and labour quite unaffected. And, like the uterine

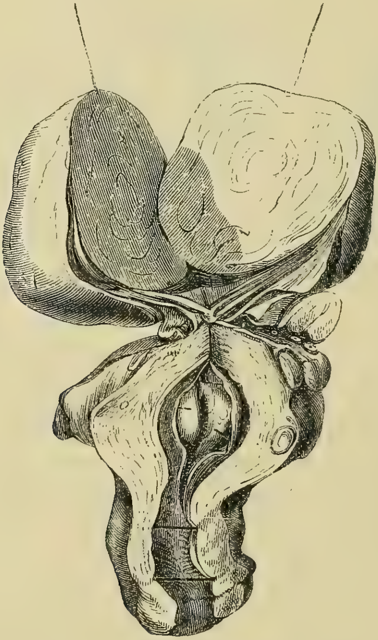

Fig. 154.—(Half-size, St. George's, xiv. 9.)

FIBROUS TUMOURS OF THE UTERUS (R. B.).

Some are in the walls of the uterus; others between the peritoneal coat and outer surface; one immediately beneath the mucous membrane projecting into the cavity of the uterus.

polypus, the sub-peritoneal tumour may be actually cast off. It then sinks down into the lower part of the abdomen, where it may cause peritonitis or mechanical distress; or, its presence may give rise to no inconvenience.

This tendency to casting-off by the peritoneal surface is well illustrated in Figs. 151, 154.

Professor Turner (*Edin. Med. Journ.*, 1861), who has discussed this subject with illustrative examples, says :—

"Should a sub-peritoneal tumour be attacked by inflammation of its peritoneal investment, and contract adhesions to surrounding parts, it is thus placed in a position favourable to become separated from the uterus. This would be especially liable to occur if it became connected to a viscus, such as the bladder or rectum, which is constantly undergoing changes both in size and position. The alternate dilatations and contractions of these viscera would necessarily exercise a considerable traction upon the tumour, which would tend to produce elongation of the pedicle; and ultimately, should the case be sufficiently long in operation, complete detachment from the uterus. Even if the tumour were to attach itself to a fixed part, as the pubes, or other portion of the pelvic wall, and the woman subsequently become pregnant, the growing uterus, gradually rising into the abdomen, might exercise such an amount of traction upon the pedicle as to attenuate it even to complete separation. The entanglement of the tumour between the coils of small intestine which so frequently hang down into the pelvic cavity, even although no distinct attachments took place between them, would, during the peristaltic movements of the gut, exercise a certain degree of dragging upon it, especially if at the same time its pedicle became twisted. In those cases in which the tumours attain great size, or great density, through calcareous degeneration, even without becoming connected to adjacent parts, their own weight might probably assist in producing attenuation of the pedicle; but in estimating this as a cause productive of separation, we must always bear in mind the constant and reciprocal pressure exercised upon each other by the walls and contents of the abdominal cavity."

Fleshy and Fibro-cystic Tumours.—The frequent occurrence of *tumours*, which, in many pathological and clinical points are very *distinct from the ordinary fibroids*, has not been sufficiently recognized. Yet, nothing is more important than this recognition. They cannot always be treated like fibroids; and what is more important, they cannot always be distinguished before operating. These tumours are not so often multiple as the hard fibroid; they almost invariably affect the body of the uterus; they attain a large size; they are softer, looser, more like muscle, have often interspaces filled with serum; they are more disposed to become "fibro-cystic." They are not so often encapsuled. They are much less disposed to calcareous degeneration. They are more liable to become œdematous. They are more vascular, and, therefore, more prone, under surgical interference or other violence, to become inflamed, to undergo necrosis, to give origin to septicæmia and peritonitis. They are less prone to become polypoid, or to be eliminated. They frequently give rise to profuse metrorrhagia. Fig. 155 from a specimen in St. Thomas's Museum, seems to be example of this kind. It represents a "uterus with a large tumour developed in its anterior wall. The cavity of the uterus is much enlarged, being almost equal to the long diameter of the tumour, nearly seven inches.

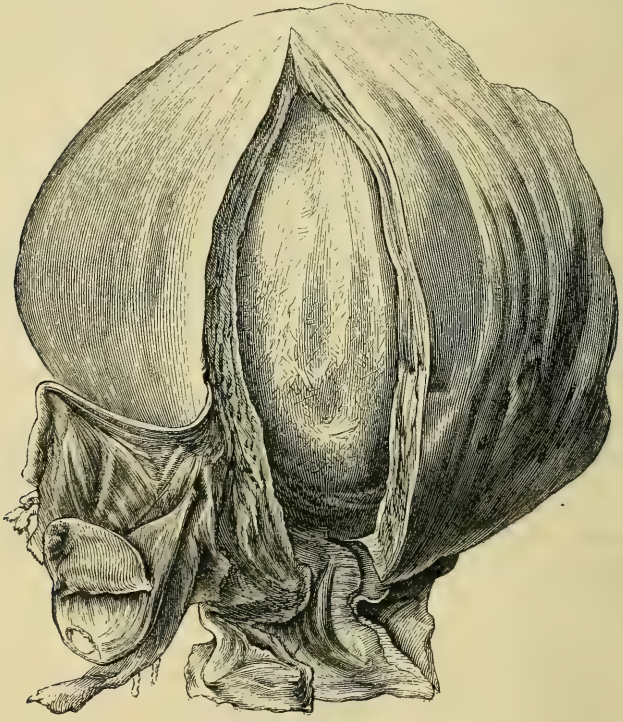

Fig. 155.—(Three-eighths nat. size, St. Thomas's, G G, 29.)

FIBROID OR MUSCULAR TUMOUR OF UTERUS, CAUSING GREAT ENLARGEMENT OF THE UTERUS AND UTERINE CAVITY (R. B.).

The posterior wall is $\frac{3}{4}$-in. thick. The subject, æt. 45, had long been subject to profuse uterine hæmorrhage."

Red, fleshy, loose-textured, they contrast remarkably with the white dense, "sub-cartilaginous" appearance of the common hard "fibroid."

The form of uterine tumour which, next to the common fibroid, has attracted the most attention is the *fibro-cystic.* This is the form which has so often been mistaken for ovarian tumour, even inducing the surgeon to perform gastrotomy. (See page 410.) They seem to be generally more fleshy, of looser texture than the common fibroid, more continuous with the proper uterine tissue, more vascular, and often grow to a very large size. Cysts sometimes form in the substance of fibroids through a localized inflammatory process, so that pus or serum collecting forms a cavity; or an effusion of blood into the substance may in like manner form a cavity. But in some examples there are many spaces or cysts of various sizes, whose origin cannot be accounted for in these ways.

Wilks' description seems to me the most generally accurate. "The tumour consists of the usual myomatous fibres, but instead of being homogeneous, its structure is opened by spaces which contain a watery fluid, perhaps mucoid, and perhaps blood-stained; the spaces themselves are simply fissures or gaps in the tissue, and have no proper lining."

There is one form of fibre, or myoma-cyst, which grows so rapidly that it may, says Keith, kill as quickly as an ovarian tumour. It is always fatal. It shows the clinical characters of malignancy. I have seen several, notably one operated upon by Dr. Chambers, and shown to the Obstetrical Society in 1878.

It is right to mention, although I do not quite concur in the view, the opinion of some distinguished French observers stated by Sevastopulo. This is that cystic-myoma is so rare, that many cases taken to be such are really examples of cysts adherent to the external surface of a myoma. Verneuil (1854) explained this hypothesis by showing that there often existed around fibrous bodies, in the soft zone which separates them more or less completely from the uterine tissue, true serous pouches; and that these pouches, caught and compressed between fibrous tumours, look like cysts that have formed in their substance.

There is a form of tumour, distinguished by the name of "*recurrent fibroid,*" which affects the uterus. It presents, especially in this character of recurrence, affinities with malignant disease. Probably some of the cases reported were of the nature of "sarcoma."

The following history illustrates some of the features of this growth:—Mr. Hutchinson presented to the Path. Soc. (*Trans.* vol. viii.) a uterus, the seat of recurrent fibroid. A single woman, aged thirty-nine, had repeated floodings. The uterus was enlarged, os and cervix normal. The uterus enlarged rapidly; later a lobulated polypoid mass occupied the vagina connected with an intra-uterine growth. The discharge was very offensive; the patient's aspect resembled that of malignant disease. A portion of the mass was removed by the hand.

The patient's state was very critical for a fortnight afterwards, masses of slough coming away. Then she recovered, and the uterus scarcely exceeded its normal size. But after some months of apparent good health flooding recurred, and the uterus was again found very large. Another attempt at enucleation was made by the hand. Again she recovered, the uterus returning to its ordinary size. Two or three months later the floodings returned, and a large growth was found in the uterus. It was removed by ligature, but she died in a fortnight. Every organ in the body was found healthy except the uterus and vagina. The uterus on section was found to contain a white soft growth, attached by a very broad basis to the whole of the fundus and posterior surface. The mucous lining of the cervix was healthy. The tumour grew far too rapidly for a fibrous tumour, was too soft, and too lobulated. Fibrous tumours, too, do not reproduce themselves. There were no other deposits in any organ of the body, although the disease had existed three years. Its history is like that of recurrent fibroids elsewhere. Bristowe, who reported on the tumour, confirms the opinion of Hutchinson. It did not present the characters of any of the forms of cancer usually met with; it was certainly not fibrous; there was no cancer-juice. The tumours were composed of the characteristic oat-shaped cells freely mingled with others of a flattened fibroid form, each containing a single nucleus, having within it several clearly defined nucleoli.

Mr. Callender describes (*Pathol. Trans.*, vol. ix.) a case of recurrent fibroid tumour of the uterus, with growths of a similar character in the pericardium, the lungs, and in the body of the sixth cervical vertebra. Partly by repeated operations, partly by sloughing of portions of the growth, considerable fragments were from time to time removed. The fragments removed presented the ordinary characters of recurrent fibroid tumour. Profuse hæmorrhages occurred, portions of the tumour being discharged. This was her history for several years. The uterus at last increased greatly in size, being felt above the umbilicus, and a lobulated soft growth occupied the vagina, and was continuous with that which filled the interior of the womb. She died exhausted. The impression was that the operations did not retard the growth; the reproductive power was so great. The uterus contained a tumour continuous with one in the iliac fossa. Passing up from the pelvis, the lumbar glands were found infiltrated with the fibroid material.

Carswell figures (*Pathol. Anatomy*) an erectile tumour of the uterus. Fig. 156 "represents an erectile tumour of the uterus which gives rise to frequent and extensive hæmorrhage. *a.* Vagina; *b.* Cavity of uterus greatly enlarged; *c.* A fibrous tumour lodged in the substance of the uterus, and projecting inwards, covered by the mucous membrane *d*; *e.* The erectile tumour rising above the surface of the uterus, covered by a smooth, glossy membrane, and traversed by a multitude of vessels, from which the hæmorrhage proceeded."

In the same work Carswell figures a specimen of atrophy of the uterus and ovaries from ossification of the arteries. Projecting in the cavity of the uterus is "a tumour composed of dilated veins and celluło-fibrous tissue."

The Development and Decay of Fibroid Tumours.

1. *During the period of growth.*—A fibroid tumour being like in constitution to the uterine muscular wall, growing in it and depending upon it for its existence and nutrition, may be expected to follow closely the conditions of its parent organ. Accordingly, it grows during pregnancy, and undergoes retrogression or involution when pregnancy is over; and sometimes involution being thus started passes into atrophy, and the tumour disappears altogether, as in cases narrated by Dr. Sedgwick,* Scanzoni, and others. Thus pregnancy may, in very exceptional cases, it is true, cure fibroid tumours. This process

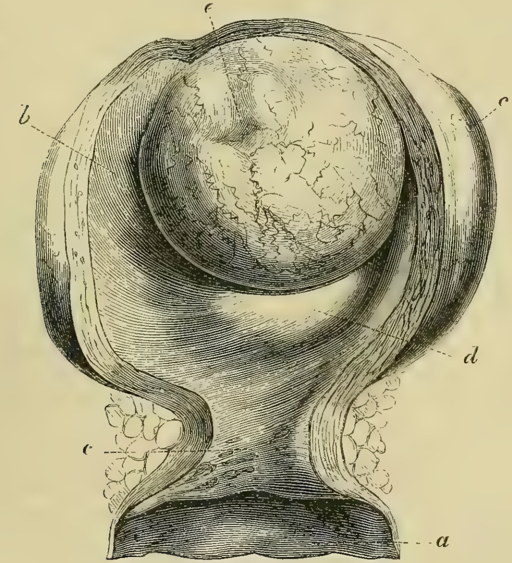

FIG. 156.—(Half-size. Carswell.)
ERECTILE TUMOUR OF THE UTERUS (MALIGNANT ?).

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* "St. Thomas's Hospital Reports."

of complete absorption or atrophy has been questioned. It has been objected that the tumour was simply cast off unobserved. But since the uterus itself may vanish through atrophy, so, *à fortiori,* may a fibroid tumour. The process, in most cases, no doubt is *fatty degeneration* the same as that which melts away the useless muscular tissue of the uterus. Lancereaux says the fatty transformation of fibroids is the most common. Virchow says it is perhaps constant. Klob expresses a similar opinion. Clinical observation will, I think, dictate a limit to this rather absolute doctrine.

They may *soften and become fluctuating,* œdematous. Cavities or cysts may form in them containing pus, blood, or serum. When these cysts are large, and the tumour rises into the abdomen, the tumour is called fibro-cystic, and may simulate ovarian disease. It is not often the pure fibroid which is liable to this state, but the more fleshy tumour, whose texture is looser and more continuous with the proper structure of the uterus. The fibroid may undergo inflammation, suppuration, and gangrene. This is also one of the ways in which fibroids are eliminated under pregnancy and childbed.

It has been supposed that fibroid polypi are liable to become converted into scirrhus or *cancer.* It can hardly be admitted that the abnormal muscular growth of which they are composed is more liable to such a change than is the normal muscular structure of the womb. A muscular fibre cannot be changed into cancer. It may, however, give place to it. It is quite possible that the cancer element may be developed in the substance of a uterine tumour, as it may be in the proper substance of the uterus; and that the activity of the new growth may cause the atrophy of the old, and the gradual substitution of a cancerous tumour for a benignant polypus.

Or the normal structure of the uterus or vagina being first the seat of cancer, the disease may spread and invade the fibrous tumour. Of this I have seen examples. In one case I removed a large fibroid or muscular tumour which showed no trace of malignant disease. The patient got apparently well; but two years later it was found that malignant disease had been developed in the uterus.

The following history by Drs. Benporath and Liebmann illustrates this question:—A woman, aged forty-eight, had suffered from metrorrhagia, had had in early life several abortions, and in the latter years had never conceived. A tumour became manifest in the abdomen. After death a careful examination was made. There was a fibroid near the right Fallopian tube; another almost encircling the uterine cavity lower down; carcinoma of the upper part of the vagina. It resulted that the lower segment of the uterus was invaded by the progress of the vaginal cancer, and with it the fibroid tumours contained in its walls. The lower parts of the tumour were most affected, the upper parts, those most remote from the original seat of the cancer, were free. The case may be summed up as follows: Uterine fibroids possess no immunity from cancerous degeneration; but they are scarcely more prone to it than the proper uterine tissue.

2. *During the period of retrogression.*—When the normal ovarian stimulus to uterine growth ceases at the climacteric, there is a tendency in fibroid tumours to undergo the like retrogression or senile involution or atrophy which seizes upon the uterus. They sometimes diminish in bulk. They generally tend to become inert, offending only by their bulk and mechanical interference with surrounding organs. But not seldom, uterine fibroid growing prolongs the period of uterine growth. Hence hæmorrhages continue recurring with more or less periodicity until the age of fifty, or even beyond.

Cretification.—In muscular tumours and polypi of long standing, the vessels often become very scanty, or disappear. Their entire structure sometimes undergoes an *earthy or bony degeneration.* In this condition the hæmorrhages which had attended the earlier stages of their growth often cease. They seem to be removed by this change from the sphere of organic activity, and excite little or no irritation in the organs with which they are connected.

I examined the body of a lady who had died suddenly from heart-disease, at the age of about sixty. Thirty years previously she had suffered from repeated uterine hæmorrhages, when she was thought by her physicians in Holland to be labouring under scirrhus uteri. I found one of the ovaries converted into bone; the other partly into cartilage and partly bone. In the place of the uterus was an immense firm, fibrous tumour, partly converted into an osseous substance. This tumour had undoubtedly been the cause of the floodings she had experienced in early life.

This stony or bony conversion is not very uncommon. It especially affects the hard fibroid tumours. There are excellent examples in most of the hospital-museums of London. Fig. 157 is from a specimen in St. Thomas's.

The process of calcification may be manifested in two forms: one is peripheral incrustation, by which the tumour acquires a shell of calcareous matter; the other is, calcareous infiltration, the substance of the tumour being pervaded with the earthy material. This is found to be phosphate of lime and carbonate of lime. Virchow showed that by decalcifying these uterine stones one might bring back into evidence the muscular fibres. It is therefore to be inferred that the calcareous change chiefly attacks the connective tissue.

In St. Bartholomew's Museum is a specimen (No. 32.50) which affords clinical illustration of one feature in the history of calcification. "It is a large lobed fibrous tumour, spontaneously expelled from the uterus. The texture is softened and soaked with fluid, as if through partial decomposition. On its surface are numerous thin plates of bone-like substance, which seem to have been nearly separate while it decomposed. The plates are simply calcification of the fibrous tissue. Patient, aged forty-six, had observed the tumour for twenty years; during that time had borne many children. For many weeks prior to discharge of tumour, which was expelled with pains like those of labour, flakes of bones passed away. Her recovery was complete." (Catalogue.)

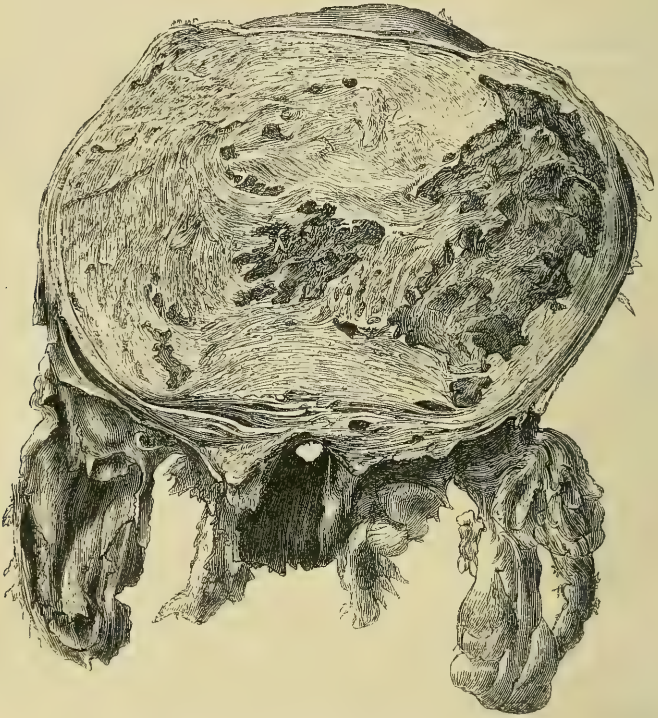

FIG. 157.—(Half-size, St. Thomas's, G. G. 40^2.)

OSSIFIED OR CRETIFIED FIBROID TUMOUR OF UTERUS (R. B.).

This source of bone must be borne in mind. By examination, the masses discharged may be distinguished from the fœtal bones of extra-uterine gestations.

Effects of Fibroids upon the Uterus, surrounding Organs, and the System generally.—Let us first examine the *connexion of fibroid tumours with the uterus.* The hard fibroids commonly have no continuity of tissue with the uterine substance. They are surrounded by a layer of loose connective tissue, and then by developed muscular tissue of the uterus disposed in a stratified manner. The tumour is therefore encapsuled. It is upon this disposition that the process of enucleation, spontaneous or surgical, depends. In some cases, however, it is presumed as the consequence of inflammation, the tumour contracts *adhesions with the uterine wall.* This may occur whilst the tumour is still intra-mural, attachments forming with the muscular wall in which it is embedded. But when the tumour has become polypoid, and projects into the uterine cavity adhesions become more frequent. Thus a tumour may be more or less completely adherent to the mucous membrane of the uterus or vagina. There is a fine example of vaginal adhesion in St. George's Museum (xiv. 43). The uterine adhesion is not uncommon; it may usually be broken down by the finger.

The source of the hæmorrhage which is so common a consequence of fibroid tumours and polypi. It has been contended that the blood flows principally, if not exclusively, from the surface of the polypus. Lisfranc especially strenuously advocated this view. It has been urged in support, that the hæmorrhage is observed to be immediately arrested upon the removal of the tumour, and even in many cases upon the application of a ligature. It has been pointed out that the pedicles of large polypi frequently carry blood-vessels of considerable size, that the investing membrane is highly vascular, and that it has been seen to pour out blood upon being injured. On the other hand it has been urged that the real source of the blood is the mucous surface of the uterus. Whilst the particular facts urged in support of the view that the surface of the polypus pours out the blood, admit of a complete solution by the theory that it is poured out by the uterus, there are also special reasons which support this latter opinion. It is observed that profuse hæmorrhage attends very small polypi as well as those of large size; and it is difficult to imagine how the extensive and rapid losses of blood which often occur can escape from the surface of a tumour in many instances not larger than a small nut. Again, the hæmorrhage mostly assumes the form of profuse menstruation; and it will not be contended that the ordinary menstrual flow comes from any other source than the uterus. Metrorrhagia may arise from any cause which sets up a preternatural action. The presence of a polypus is a cause of increased afflux of blood. It is difficult then to avoid the conclusion that excess of the ordinary menstrual discharge, occurring when a polypus is present, flows like the normal proportion from the womb. When the tumour or polypus is very large, almost the entire mucous membrane of the uterus may be protruded before it; that is, there is no mucous membrane but that investing the tumour. Why the hæmorrhage ceases when the tumour is removed, is exactly why it ceases after the expulsion of the ovum in abortion. The developmental attraction of blood is at an end.

It has been observed that in some cases the menstrual flow is actually lessened.

Virchow suggests that fibrous bodies may possess a sort of *erectility* by virtue of which they may at times be larger or smaller, harder or softer. This would depend upon the varying quantity of blood, and varying muscular action. It is certain that some tumours enlarge and soften at the menstrual epochs and during pregnancy. Some become *œdematous;* and it is by the absorption of the œdematous fluid that we may account for the occasional apparent diminution of these tumours under the treatment by ergot and other means.

Fibroids almost invariably cause *enlargement,* more or less *deformity,* and *displacement of the uterus.* They may produce every variety of flexion, and even inversion. By attracting an undue supply of blood, they often induce congestion; sometimes chronic endometritis; these conditions give rise to hypertrophy of the uterus generally, and to glandular irritation and outgrowths in the cervix.

The disposition to neoplasmata or out-growths where fibroid tumours exist, is very great. Thus we frequently find not only multiple tumours in the body of the uterus, but tumours of various kinds in the cervix as well. And it is not uncommon to find complications in the form of cystic disease of the ovaries, and dilatation with obstruction of the Fallopian tubes.

In St. Bartholomew's Museum is a specimen (No. 32.52) of a uterus, in the side wall of which is embedded a large fibrous tumour. The tumour has bent the uterus laterally, and so encroached upon its cavity, that the cervical portion was shut off from that within its body. The cavity of the uterus is greatly dilated; its walls are thinned; its mucous membrane was intensely vascular, and it was filled with pus.

Another specimen in the same museum (No. 32.13) shows retrograde dilatation of the uterus above the seat of constriction. It exhibits the obliteration of that portion of its cavity which is within the cervix. The rest of its cavity is dilated. The extremities of the Fallopian tubes are adherent to the ovaries.

But in a considerable proportion of cases the cervical portion remains free from other than mechanical distortion. A small fibroid in the anterior wall of the body may cause anteflexion, one in the posterior wall retroflexion. A larger tumour in the anterior wall may, however, push the fundus over backwards, producing retroflexion, and *vice versâ.* If growing in the sides of the uterus, or indeed elsewhere, if they develope unequally they destroy the symmetry of the organ, may distort it in any conceivable manner, so that there is nothing in Nature more fantastic than the shapes which a uterus invaded by fibroid tumours may assume. The cervix itself, although generally free from tumour, may be twisted and distorted in the most extraordinary manner. It is often flattened out on the deformed body of the uterus; the course of its canal is made tortuous, and its calibre compressed or obliterated. The os uteri may be small or large. Sometimes it is very difficult or impossible to pass a sound along it, so devious and narrow is the canal.

The uterus impeded in its functions gives rise to the following symptoms: *dysmenorrhœa, dyspareunia,* and *sterility.* These are especially apt to occur when the body of the uterus is bent upon the cervix at a right or even an acute angle, constricting the os internum. In the event of pregnancy occurring, *abortion* is a very probable issue. Such cases may lead to profuse flooding. The uterine wall is unable to contract uniformly. The course to adopt is—1, to remove the ovum completely, after dilating the cervix, if necessary; 2, by swabbing the interior of the uterus with persulphate of iron or tincture of iodine.

Fibroids may cause *dragging and atrophy.* Thus Bristowe and Hutchinson (*Path. Trans.*, vol. viii.) report on a case of absence of the cavity of the uterus and extreme atrophy. Two tumours existed, and had become pedunculated, and it is evident that between them the uterus had been pulled out and attenuated. It is probable too that in this case, as in others, the tumours were at first surrounded by the substance of the uterus, and that as they became detached, they carried with them as a capsule a considerable portion of the uterine tissue, which has since wholly disappeared, and between these two processes, co-operating in the same direction, there can be no difficulty in understanding how the body of the womb should have been reduced to the remarkable condition in which it was found. Fibroids may even cause axial twisting of the uterus, as in a case related by Dr. E. Küster.* "An unmarried woman, aged thirty-four, who had suffered from dysmenorrhœa, died of diarrhœa. The body of the uterus was as large as a man's head, and presented several projections on its surface. Through the enlargement of the body of the uterus, the neck was enormously drawn out and twisted. It had undergone two and a-half turns, so that the right ovary was turned to the left and forwards, and the anterior surface of the uterus was turned backwards. The cervical canal was almost closed; its walls were very thin, its length was ten centimetres. The cavity of the uterus was filled with blood."

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* "Beiträge zur Geburtskunde und Gynäkologie," 1870.

A sub-mucous tumour even if not quite polypoid, may by pressure upon the opposite uterine wall cause *ulceration, perforation, and even rupture of the uterus.* Larcher relates the following case (*Arch. Gén. de Méd.*, 1867): "A woman was admitted into the Hôtel-Dieu with pain in the abdomen. After four days profuse bleeding set in. She refused examination. Two days later meteorism and peritonitis appeared, and she died. Section revealed diffuse peritonitis and adhesion of all the organs of the small pelvis. A polypus was found in the uterus, seated in the anterior wall near the isthmus. The posterior surface of the cervix was ulcerated, and at one point torn through, communicating with the cavity of the abdomen."

I have recorded a case (*Obstetrical Transactions*) in which a small tumour in the anterior wall of the uterus led to perforation into the bladder, owing to the pressure caused by the passage of the head in labour.

The *effects upon the surrounding organs* are those of *pressure* and consequent interference with their functions. If the uterus enlarged by tumours be retained in the pelvic cavity, and grow to the extent of compressing the surrounding parts against the unyielding walls of the pelvis, the results will be similar to those caused by retroversion of the gravid womb or a retro-uterine hæmatocele. But they come on more gradually. The uterus in its growth causes excentric pressure. The *bladder*, at first irritated, is frequently excited to void itself, then, perhaps, retention of urine follows. Then may follow in retrograde or ascending order distension of the ureters, pelvis of kidney, hydronephrosis, and urinæmia. Intermitting retention of urine is occasionally noticed at menstrual periods. The *rectum* may exhibit signs of tenesmus, and constipation is very common. Pain and reflex irritation set up expulsive efforts in the uterus and abdominal muscles.

Complete obstruction may even be caused, and simulate most of the conditions of strangulated hernia. Dr. Peter Eade, of Norwich, commenting (*Lancet*, 1872) upon three cases of the kind, suggests that such cases might be relieved by Amussat's operation, and asks whether exploratory gastrotomy, with a view to the removal of the tumour, be worthy of serious consideration in the case of intestinal obstruction? If the obstruction be connected with moveable sub-peritoneal tumours, as in one of Dr. Eade's cases, this proceeding would offer considerable hope of benefit. But where, as is most frequently the case, the obstructing tumours form part of the uterus, little good can be expected from gastrotomy, unless the uterus itself be removed. But regarding intestinal obstruction or strangulation from a broad surgical point of view, it may fairly be stated as a general proposition, that if no external hernia be found as the presumed seat of obstruction, search should be made for it by gastrotomy. Cases of internal strangulated hernia have been reported which justify this operation; and we may find constriction by fibrinous adhesions, which may be divided, or twisting of the bowel, or invagination, which may be released.

Pressure upon the sacral plexus may cause excruciating pain in the form of sciatica. This I have seen several times. Dr. G. H. Kidd relates an interesting example (*Dublin Med. Journ.*, 1872). The pain was relieved by wearing an air pessary to lift up the tumour. The tumour ultimately completely disappeared. Dr. Kidd calls attention to the important clinical fact that these pressure effects are more or less intermittent. He explains this by remarking that the pressure is often greater at the menstrual epochs. He noticed in one case that sciatica was always increased at these times. He further observes that great increase of pressure arises from flatulent distension of the bowels. He has known pressure from above so caused to drive a tumour more firmly into the pelvis.

B. B. Browne, of Baltimore (*American Journal of Obstetrics*, 1877), describes a case in which *convulsions* and *coma* occurred whenever the tumour pressed upon the cervix and pelvis. There was œdema, retention of urine, but no albumen.

Pressure upon the vena cava or iliac veins may cause *œdema* of the legs, and if combined with septicæmia *phlegmasia dolens* may arise.

Large tumours growing in the abdominal cavity may produce mechanical effects similar to those resulting from large ovarian tumours. They may, although this seems rare, cause peritonitis and ascites, and adhesions resulting may lead to strangulation of the intestines. They may be the cause of laceration of the intestines by dragging, as under the influence of sudden shock or fall. And by mere bulk, they may so impede the action of the heart and lungs, as to bring about gradual asphyxia and exhaustion.

Pinault (*Bull. de la Soc. Anat.*, 1828), Neugebauer (1866), Duménil (1869), Loir (*Comptes rendus de la Soc. Anat.*, 1847), relate cases of fibroid tumours of the uterus *making their way through the abdominal walls.*

Retrograde disorder of the alimentary canal ensues from the rectal obstruction. Flatulence, various dyspeptic phenomena, blood-contamination from absorption of the products of decomposition of retained fæcal matter—a condition for which I have proposed the term "copræmia"—ensue.

A time arrives when, if the tumour is not dislodged from the pelvis, the pressure becomes so great that the distress arising from pain and impeded function becomes intolerable; and the obstruction to the local circulation may be so complete, that gangrene of the vagina is caused. The bladder becomes congested, inflamed, the ureters and kidneys distended, and death may ensue from urinæmia.

We may sum up the dangers ensuing upon the presence of fibroid tumours in the uterus as follows, premising that in a large, but unknown proportion of cases, no ill consequence occurs :—1. *Hæmorrhage.* This may be fatal. The hæmorrhage is mostly recurrent, and, as in other cases of repeated hæmorrhage, the system accommodates itself more or less to the losses, acquiring the power of rapidly regenerating blood. More often the hæmorrhages prove injurious by degrading nutrition generally, by inducing 2, *Exhaustion,* under which the patient is liable to sink gradually or more quickly under the immediate effect of some secondary disease, to which the exhausted system is especially prone. 3. A not unfrequent cause of death is *Peritonitis.* McClintock says, " from his own experience the most fruitful source of danger is peritoneal, or pelvic inflammation." The fatal attack may be induced by the giving way of the serous membrane over a fibrous tumour, which has undergone the process of softening; or there may be escape of foul matter from the tumour into the peritoneum. *Ascites* occasionally complicates fibroid tumours, but not so frequently as it does ovarian tumours. Another mode in which not only peritonitis may occur, but 4, *Metritis* and *pyæmia,* is from partial decomposition of the tumour, or of the tissues forming its capsule. 5. *Pressure* impeding the functions of the bladder, kidneys, intestines, stomach, lungs, or heart, or causing mechanical lesions of these organs.

Symptoms and Diagnosis.—The symptoms are the expression of those features the history of which has been already discussed. They may be briefly summed up as follows :—1. Those which take their rise in the uterus itself. 2. Those which are the result of interference of the affected uterus on neighbouring organs. 3. The remote or constitutional symptoms. 4. The physical or objective signs. The signs of the first three kinds are many of them common to other affections of the uterus or of neighbouring structures. They can hardly obtain the importance of being diagnostic. Thus, pain and hæmorrhage referred to the uterus, attend many other conditions. The pain is generally of spasmodic character; it is more common when the tumour projects into the uterine cavity, or towards its external surface; it is in these cases the evidence of contraction tending to cast out the tumour from its walls. It is not constant. Scanzoni observes that the spasmodic pain is greater in the case of intramural tumours than of polypi.

The hæmorrhage varies greatly. Cruveilhier had noticed that it was less common when the tumour was sub-peritoneal. It is most common when it is sub-mucous, and is rarely absent when it is polypoid. It usually observes some degree of periodicity, that is, it takes the form of menorrhagia. But, in not a few cases, hæmorrhage breaks out in the intermenstrual intervals; and in some of long standing, it becomes constant or nearly so, alternating at times with a sanious serous oozing likened to the green waters which follow labour.

Irritation or obstruction of the bowel or bladder, dorsal and sacral pain, dysmenorrhœa and dyspareunia, with or without hæmorrhage, are common to retro-uterine hæmatocele, and retroversion of the uterus.

The remote signs, those referred to the nervous system, and those resulting from blood-impairment and disordered nutrition, are equally observed in various other pelvic disorders. We are then compelled to resort to physical exploration in order to trace these symptoms to their actual cause. Pain and hæmorrhage must be regarded as "conditions indicating the necessity for examination."

When examination is made by touch we become conscious that the uterus is altered in size, shape, position, and consistence. We then, by applying the various means at our disposal, try to assign these alterations to their true cause. Of the cases which most frequently lead to error some are external to the uterus; they deceive by concealing the uterus from observation. The moment we can detect the uterus and can determine its outline, we are at once in a position to exclude tumours in its substance. Such are retro-uterine hæmatocele, perimetric inflammatory effusions, ovarian tumours, accumulations in the rectum.

In some cases the source of error lies in conditions of the uterus itself. Such are retroflexion, anteflexion, and other deviations from the natural shape; enlargement from hyperplasia, of the uterus; pregnancy; malignant disease of the uterus.

The diagnosis of fibroid tumours flows in great measure from the consideration of their natural history, and of the effects they produce upon neighbouring organs It is, however, especially necessary to call attention to the signs brought out by physical exploration. The uterus is almost necessarily *increased in bulk.* This may be determined by vaginal touch. Poising the uterus on the tip of the finger we feel the increased weight. By combining abdominal palpation, we determine accurately the extent of the enlargement, measuring the organ between the two hands. We may often distinguish enlargement due to fibroid tumour from the enlargement due to pregnancy, hypertrophy or sub-involution, by observing the form of the uterus. In the latter cases the enlargement is uniform, the organ remains smooth on the outside, whilst tumours distort the contour, causing irregular bumps or protuberances; and these protuberances are often harder than the proper uterine structure.

Whilst the tumours are small, the *mobility* of the uterus is not much affected. But when they become large, *it may be much impaired or completely lost.* This is especially the case when the enlarged uterus is locked in the pelvis. This immobilization is distinguished from that produced by cancer by the os and cervix uteri being felt free from disease, by the absence of the other characteristic signs of cancer, and by the presence of the irregular nodosities on the fundus or body of the uterus, felt above the pubes. It is distinguished from the immobilization due to perimetric inflammation by the history of this latter affection; by the seat of the inflammatory deposits outside the uterus as ascertained especially by rectal touch.

Fibroid tumour of the posterior wall of the uterus producing retroflexion, or bulging of the posterior wall, is very likely to be mistaken for retro-uterine hæmatocele, or for simple retroflexion of the uterus. In all these cases a firm rounded mass is felt behind the cervix uteri apparently continuous with it. Combined rectal and abdominal palpation will help in the differentiation. But the sound gives the clearest evidence. If the sound penetrate in the normal axis of the uterus, the hand pressed in behind the symphysis will feel the body of the uterus impaled on the sound, and will make it clear that the mass felt behind the cervix is something else. Retroflexion is also determined by the sound being directed backwards; and simple retroflexion is made evident by our being able to lift up the fundus of the uterus, thus removing the apparent tumour. This can rarely be done if the apparent tumour be really a fibroid. If, when the sound is in the uterus, the contour of the body be explored by the finger or hand in the rectum, the presence of tumours may be made out with considerable probability by the irregular knobbed projections they produce.

Anteversion of the uterus may be distinguished by similar tests.

When tumours are of large size, especially if fluctuation can be made out in any part, the risk of confounding them with ovarian tumours is great. This point has been discussed when studying the diagnosis of ovarian tumours. One of the most characteristic marks of distinction is brought out by the sound. By the use of this instrument and by the finger, we may generally in the case of ovarian tumours determine that the uterus is of normal size, and move it about separately from the tumour; and *vice versâ*, moving the tumour about by the hand applied to it on the abdomen, we find that no movement is imparted to the uterus. But great caution is necessary in trusting to these manœuvres. If the sound penetrate much beyond the normal length, the probability that the elongation of the uterine cavity is due to fibroid tumours is very great. The best sound to use in these cases is the whalebone probe, Fig. 44, p. 156. This will follow the sinuosities of the uterine cavities without danger of injuring the uterine wall.

The diagnosis of retro-uterine hæmatocele, perimetric inflammation, and ovarian tumours has been carefully discussed in the chapters treating of these subjects. The chief means of distinction consist of careful palpation, aided by the sound, so as to define the size and position of the uterus, and to isolate it from the extra-uterine tumefaction. In uterine fibroid the uterus, unless jammed in the pelvis, generally retains some degree of mobility; and when immovable from locking in the pelvis, the cervix is generally distorted, and the history is distinctive. In perimetric deposit there is a history of inflammation dating back to labour, abortion, or other tolerably defined event; whereas in fibroid the history is less defined, more often associated with menorrhagia, and of longer standing.

I have known a fibrous tumour in the bladder simulating fibroid in the anterior wall of the uterus or anteflexion. The sound *in utero* and the catheter made the case clear.

McClintock points out that, to distinguish an ovarian tumour from uterine tumour, the ulnar edge of the hand should be pressed down above the pubes. If the tumour be ovarian, the edge of the hand can be passed down deeply between the tumour and the pubes. But where the tumour is uterine the hand is resisted, and cannot be sunk to anything like the same extent.

Palpation and the sound can also almost always be relied upon to distinguish flexions of the uterus. The removal of the tumour by restoring the uterus to its normal position by the sound is distinctive of flexions. The condition most likely to be overlooked is that where flexion is complicated with a tumour. In this there is generally more or less marked irregularity in the shape of the body of the uterus. Bumps or projections may be felt on its peritoneal surface or projecting into its cavity; and the size will often be greater than is usual in flexion or simple hyperplasia. If, in addition, the cervix be twisted, flattened, or otherwise distorted, the probability of the existence of fibroid tumours is greatly enhanced.

The diagnosis from pregnancy is a most important point to make out. Women, the subjects of tumour, may think themselves, or be thought by others to be pregnant. In pregnancy, the enlargement of the uterus is uniform, thus being in contrast with the often irregular contour and hardness of the uterine fibroid. The speculum is not of much value in giving characteristic signs of fibroid; but it is of great value in giving presumptive evidence of pregnancy; and thus in leading us to prosecute diagnosis in this direction. A violet coloration of the vagina and os uteri should at once impel to follow out all the other modes of investigating this question. The detection of the violet coloration by rousing suspicion of pregnancy will save us from resorting to the sound. For this reason I think it is a good general rule in practice to pursue examination in the following order:—1, by vaginal touch; 2, by speculum; 3, by sound. In many cases we shall stop at the first method, or at the second.

In doubtful cases, examination by rectum should never be omitted. By this route the finger can generally distinguish perimetric effusions by feeling their attachment to the walls of the pelvis, and by defining more accurately the outline of the uterus.

By the sound we can often make out the exact position of a tumour. Thus it may penetrate beyond the normal uterine length behind or in front of the tumour, which may then be felt between the finger or hand by vagina, abdomen, or rectum, and the sound in the uterine cavity. We thus learn in what part of the uterine wall the tumour is situated.

It is chiefly when we have to deal with tumours of considerable size, too big to be retained in the pelvis, that we have to make the diagnosis from ovarian tumour and pregnancy. The difficulty is often increased by the fact that these large tumours cause so uniform an enlargement of the uterus, that the shape closely resembles that of the pregnant uterus. Having excluded pregnancy, which we ought always to be able to do, by carefully collating all the historical data and the physical signs, positive and negative, and especially by the aid of time, which seldom fails to resolve doubts upon this point, we may resort to the sound. By help of this we may generally exclude ovarian tumours. If the sound have to pursue a devious course through the cervix, or if it run to a distance much beyond the normal length along the direction of the tumour, we shall rarely be wrong in concluding that the case is uterine tumour. Or, if the mass is solid, the probability that it is uterine is very great. It must, however, be remembered that in some cases of great enlargement of the uterus by fibroids, the sound will not travel beyond two or three inches. It may also be stated as a general law that when a portion of a tumour projects into the pelvic cavity, it is uterine. In the case of ovarian tumours so large as to rise into the abdominal cavity, the projection of any portion into the pelvis is very rare.

There is one character occasionally present in fibroid tumours especially to be borne in mind when the question lies between these tumours and pregnancy. In a considerable proportion of cases a sound resembling the placental sound is heard. This had been insisted upon by Depaul (*Traité d'Auscultation Obstétricale*, 1847). "Sometimes," says McClintock, "the sound is short and abrupt, a mere whiff accompanying each arterial pulsation. At other times it is prolonged and musical, and not to be distinguished by the most acute and practised ear from the *bruit placentaire*." We should not, then, declare that the case is one of pregnancy on the single evidence of this sign. Nor is it likely, if pregnancy exist, that we shall be reduced to this necessity. Almost invariably some other confirmatory sign will be present. The cases of real difficulty are those where both pregnancy and tumour exist together. The chief character in this complication is the want of uniformity in the shape of the uterus.

In some cases of doubtful diagnosis we may arrive at distinct evidence by dilating the cervix uteri, so as to facilitate exploration of the internal surface of the uterus. Then by sound, or even by the finger, we may feel a tumour forming a projection into the cavity, or we may by finger in the cavity and combined abdominal palpation, take accurate note of the condition of the intervening uterine wall. This mode of exploration is especially indicated when the subject is suffering from hæmorrhages. It thus becomes a means of treatment as well as of diagnosis.

Acupuncture, or the aspirator-trocar may be usefully employed. Guéniot has discussed this subject (*Arch. Gén. de Méd.*, 1868). He observes that it gives indication as to sensibility, resistance, hardness of tissue, and the greater vascular development. In a woman, aged fifty-six, a second tumour was discovered immediately after the removal of a uterine tumour, the place of which it assumed. The closest examination left it doubtful whether this was a second fibrous polypus or a partial inversion. The sound penetrated a short distance all round the tumour. Puncture caused no pain. It was concluded to be a fibrous tumour, and was removed with a good result.

Diagnosis may be difficult when the uterus, enlarged by fibroid tumour, is complicated with ascites. In this case a sensation of *ballottement* is felt, differing from the intra-uterine *ballottement* of pregnancy in this, that it is more distinctly felt above the pubes through the abdominal wall.

Malignant tumours of the lumbar glands, peritoneum, and surface of the intestines may also simulate uterine tumours. In these cases we may derive diagnostic indications from the history and general symptoms. It is rare for fibroids of the uterus to be attended by such marked constitutional symptoms as are commonly observed in malignant disease.

Uterine tumours, like ovarian tumours, may be distinguished from tumours arising in the abdominal cavity by tracing them from the pelvis upwards. Tumours of abdominal origin may usually be traced from above downwards, leaving a line or space of demarcation at their lower margin, below which there is resonance, marking them off from the pelvis.

In determining the course of treatment, especially the direction of operative measures, it is important to form an opinion as to the part of the uterus an intra-uterine tumour grows from. This may often be done by observing a character pointed out by Dr. Kidd. He says the uterus bulges out most in the wall opposite to that to which the tumour is attached. So that feeling a decided prominence, say of the anterior wall, we may predicate with certainty that the attachment of the tumour is at the opposite part of the uterus.

The Treatment of Tumours, especially Fibroids of the Uterus.— In discussing this question, it is evidently desirable to keep in mind the properties and natural history of these tumours. The natural terminations furnish the most useful indications. Knowing these terminations we may often assist in bringing them about. These terminations we have seen are: 1. Absorption or atrophy. 2. Calcareous degeneration. 3. Gangrene or other form of decomposition. 4. Spontaneous expulsion or enucleation.

1. Can we aid or bring about the process of *atrophy?* This question involves the inquiry into the action of internal remedies and local solvent applications. We have seen that tumours have occasionally vanished under the influence of pregnancy and labour. In some of these instances the process of elimination was in all probability inflammation and breaking-down of the tumour; in others, detachment and expulsion; but in others, there seems no reason to doubt that it was true absorption, analogous to that process by which the excess of proper uterine tissue is removed after labour. Then, again, there is the slower atrophy of advancing age. Can we set up or accelerate similar atrophic processes? Before entering upon this question, it is desirable to discuss a very important practical question which not infrequently comes before the physician.

What is the Risk of Marriage to a Woman known to be the subject of Uterine Tumours?—I have discussed this question in my work on *Obstetric Operations,* and can only give the general conclusions in this place. All authors agree in the opinion that pregnancy brings serious danger; and all agree in discouraging those who are the subjects of uterine tumours from marriage. This is certainly the wiser course. Apart from the dangers attending pregnancy, the increased afflux of blood and consequent developmental force excited under the conditions of the married state give material impetus to the growth of these tumours. Metrorrhagia will probably be increased. And, although fibroid tumours act in many cases as an obstacle to impregnation, still pregnancy often occurs notwithstanding. If pregnancy and labour are occasionally observed to be followed by the atrophy or expulsion of the tumours; and if, as is even more frequent, no accident occur to interrupt the smooth course of pregnancy, labour, or childbed, the tumours remaining unaffected, the accidents in other cases are so serious that we shall rarely be justified in sanctioning disregard of the established rule. In cases where we can clearly determine that the tumours are seated in the substance and projecting on the peritoneal surface of the fundus of the uterus, we may predicate that the risk is small. But where tumours are found in the lower segment, and especially if projecting into the cavity of the uterus, the danger is so great that we are bound to prohibit marriage with all the authority we possess. Tumours in this situation are doubly dangerous; they are exposed to bruising and tearing during the passage of the child; they may descend before the child into the pelvic cavity, and obstruct labour.

Medicines have been given with the four following designs: 1. To promote absorption or calcification. 2. To restrain growth. 3. To restrain bleeding. 4. To promote extrusion.

Medicines designed to promote absorption and to restrain growth may fitly be considered together; and some agents which are chiefly given for their supposed efficacy in restraining hæmorrhage probably act also by promoting extrusion. Simpson, Rigby, and others were very positive as to the absorption of fibroids. A true *fibrous* tumour will hardly disappear spontaneously; but muscular tumours rapidly grow and rapidly disappear. The cellular spaces between the fibres of these tumours may become filled with serum; and that portion of the tumour thus due to œdema may undoubtedly disappear. In such cases Wells thinks the use of bichloride of mercury is often followed by remarkable diminution. Simpson praised the bromide of potassium. Where there is much irregular bleeding, Wells agrees with McClintock in regarding chloride of calcium as of great value. This remedy had been introduced by Rigby in 1846. He says he "found that, if commenced in ʒss. doses of the solution twice a-day, the patient could gradually increase it until she had reached ʒj. without inconvenience. After continuing at this dose for a month, she left it off for a few weeks, and again resumed it as before; a decided change was observable in several cases." McClintock relates a case in which complete cure was effected by this remedy combined with perchloride of iron. Wells, however, has found that, if persisted in for a length of time, the chloride of calcium is apt to bring about calcareous degeneration of the arteries generally; and this is so real a danger that the remedy must be used with great caution. Its action in arresting the growth of fibroids probably depends upon this property. The tumour perhaps has a greater affinity for the chloride of calcium than have other structures; and if the calcareous deposit could be limited to it, the remedy would be without a drawback.

Rigby further possessed great faith in the Kreuznach water. Adopting the suggestion of Dr. O. Prieger, he tried this water in a very concentrated form, and believed he increased its efficacy by adding from two to five grains of bromide of potassium. "In many cases," Rigby says, "the results have been very successful; in some, where this artificial mineral water formed the sole treatment; in others, where it was combined with the local application of leeches and mercurial ointment." But West and Scanzoni doubt whether the Kreuznach waters have cured a single case.

The remedies applied in the hope of restraining growth are the same as those designed to promote absorption. It may be reasonably expected that greater success would be attained in accomplishing this lesser result. Observations upon this point are, however, even more fallacious. If we can demonstrate a sensible diminution in the bulk of a tumour, and even follow the diminution on to complete disappearance, the only doubt as to the reality of absorption rests on the possibility of an original error of diagnosis. The supposed tumour might have been retro-uterine hæmatocele, an enlarged body of the uterus from hyperplasia, or some other condition. That some cases of cure by absorption reported before the characters of retro-uterine hæmatocele were known were falsely interpreted is highly probable. But the reality of fibroid tumours having been absorbed is too well established to admit of doubt. Depaul and Béhier relate cases of absorption in non-pregnant women (see *Pozzi*). It does not, however, follow that this absorption was due to the remedies employed. In some cases of absorption no treatment deserving consideration was adopted. And in the rest in which internal remedies were used, doubt as to their share in the result is not unjustifiable. My own experience lends little or no support to the proposition that internal remedies exert any influence in promoting absorption of the hard fibroid tumour. I suspect that the favourable opinions as to their efficacy, which some authors have expressed, spring from the observation of the larger, looser-textured tumours, and that the diminution was due to the absorption of fluid infiltration, the solid constituent remaining untouched.

Sustained pressure, as by means of an abdominal belt, may be useful in promoting the absorption of infiltrated fluid. It is doubtful whether it exerts much influence in diminishing the solid constituents. It may, however, be useful in supporting the mass, and in preventing injurious dragging.

The ergot of rye has also been used with this indication. It has been supposed that nutrition might be arrested by the constricting action of the ergot upon the vessels feeding the tumour; and by the compression exerted upon the tumour by the contraction of the muscular wall. Hildebrandt (*Berlin. Klin. Wochenschr.*, 1872) practised sub-cutaneous injection of ergotin. (See also a Memoir by this author, *Amer. Journal of Obstetrics*, 1875.)

The evidence in reference to this practice is not conclusive.

Byford sums up (*Trans. of Amer. Med. Assoc.*, 1875) one hundred and one cases in which ergot was used. Of these twenty-two were reported cured; thirty-nine to have been attended by diminution in bulk; in nineteen the hæmorrhage was lessened; and in twenty-one the result was *nil.* Atthill (*Irish Hosp. Gaz.*, 1874) procured some benefit in one case; in two cases severe inflammation caused the patients to refuse further treatment. Hildebrandt's method is as follows:—He prepares a fluid consisting of Wernich's watery extract of ergot 3·0, glycerine and distilled water, of each 7·5 parts. Of this he injects about forty minims *deeply* into the sub-cutaneous tissue of the abdomen. Done in this way, he says, abscess does not occur. The injections must be repeated daily or two or three times a week over two or three months. Failure, says Hildebrandt, is rare in fitting cases steadily treated. It is of no use in old hard anæmic tumours, or in sub-peritoneal tumours. And Spiegelberg points out that only the non-encapsuled tumours can be influenced.

But more frequently ergot has been used with the object of promoting the expulsion of the tumour. The evidence of its use in this way is decisive. Byford gives some good examples.

In a case seen with Spencer Wells (1877) a very large fibromyoma fell into necrosis within forty-eight hours or less after dilating the cervix with laminaria-tents and the use of ergot. The tumour at its lower part had become quite diffluent, hanging in shreds; higher up it was still solid. Its connexions with its capsule were softened by the necrotic process. It was enucleated with some difficulty. The subject promised well for a time; but ultimately sank from septicæmia and phlegmasia dolens.

Atlee advocates (*Trans. of International Med. Congress, Phil.*, 1876) the combination of chloride of ammonium with ergot, and says he is satisfied that he has seen fibroids disappear under its use.

The fallacies which weaken any conclusion as to the influence of remedies in arresting the growth of fibroid tumours are: 1. That these tumours are often of extremely slow growth, so that any change in size within even a considerable time would be difficult to appreciate, and still more to prove. 2. That many of these tumours, when they have reached a certain size, exhibit no tendency to increase, but remain stationary, although no treatment is employed. 3. That in a large number of instances there is a natural tendency towards inertness or even retrogression after the climacteric; and that since these tumours frequently do not come under treatment until this period is approaching, such treatment may be merely coincident with the natural process of cure, not conducive to it. 4. That the diminution in size may be apparent rather than real, being simply due to the absorption of serous infiltration. And, lastly, the most persistent use of remedies in many cases has not been followed by any sensible alteration in the hands of many competent observers.

Cameron citing the Indian practice of attempting to bring about absorption of enlargements of the liver and spleen by punctures with long stilets, suggests that *acupuncture* may be of service in uterine fibroids. I am satisfied that this method has promoted absorption of perimetric deposits.

Electricity has been used. It is probable that this plan by which puncture is combined with the influence of electricity may give good results.

Treatment designed to *restrain hæmorrhage* may fitly be considered in connexion with that designed to promote absorption or to check growth of fibroid tumours. Treatment for this purpose consists of internal remedies, of local applications, and of surgical operations. The principal internal remedies have been already described. To chloride of calcium and ergot may be added strychnine, quinine, digitalis, hamamelys, turpentine, Indian hemp, the lead and opium pill, alum and gallic acid—all agents of unquestionable efficacy as hæmostatics. They now and then act satisfactorily, but much more often they fail. Small doses of mercury have in some cases been attended with success.

Local styptics, on the other hand, may almost always be relied upon to stop hæmorrhage for the time. Of these the best are, perchloride or persulphate of iron, chromic acid and nitric acid, or iodine. Their efficacy depends upon their being applied directly to the bleeding surface, that is, to the mucous membrane of the uterus, as well as to that immediately covering the tumour. To accomplish this, it is necessary in the first place to obtain free dilatation of the cervix uteri. This preliminary dilatation can be effected by means of laminaria or sponge-tents left in for several hours, or by incisions of the cervix. If the canal is tortuous, incisions will be necessary, at least in the first instance; and sometimes it will be desirable to resort to both incisions and tents.

The *effects of mechanical pressure* may sometimes be obviated by lifting the tumour out of the pelvis. The uterus with its parasitic growths may be moveable *en masse.* Sometimes the hand in the vagina or rectum may liberate the pelvis. But more often, a method used with success by Dr. G. H. Kidd is better. The patient is placed in knee-elbow position, and one of my dilating-bags is placed in vagina or rectum, which, made to expand below the tumour, gradually raises it. This proceeding would also be effectual by relieving the bowel from obstruction, in removing the flatulent distension which sometimes drives the tumour down into the pelvis. Or, where flatulence is extreme, and the tumour cannot be moved or extirpated, relief may be given by puncture by a fine trocar into the intestine, as was done by Dr. Kidd. In a case he relates a great escape of gas took place. A candle brought near, the gas took fire, burning with a blue flame. Next day the bowels acted freely.

It is a remarkable fact that *dilatation of the cervical canal* alone is in many cases followed by arrest of hæmorrhage. Baker Brown, Nélaton, and McClintock have established this fact as to the effect of incisions in the cervix. I have in so many instances practised this operation with advantage that I entertain no doubt of its value. It does not appear to be necessary that the tumours themselves should be cut into. The incisions should not be deep; they should especially not be carried deeply into the neck at the level of the os internum. Incisions made in this way have appeared to me to exercise a beneficial effect in modifying the nutrition of fibroid tumours; a free os uteri externum will often, as we have seen, when studying the history of dysmenorrhœa and menorrhagia, relieve these symptoms. I have acquired the conviction that these incisions have even arrested the growth and promoted the absorption of uterine fibroids.

But supposing that dilatation, whether by knife or tents, is not followed by arrest of bleeding, the road being open, we now apply the styptic. This is best done by means of a swab. A probe mounted on a wooden handle, or the instrument made to carry nitrate of silver (see Fig. 50, p. 162) answers perfectly. Around the end a little cotton wool is twisted; this is steeped in the styptic fluid, and carried quite into the cavity of the uterus and pressed steadily against the inner surface. It is desirable to have three or four of these probes mounted with cotton-wool, using one or two of them first to wipe out the blood from the interior of the uterus before introducing the styptic. To facilitate this introduction, and to obviate the inconvenience of losing much of the action of the styptic in its passage along the cervix, we may resort to one of two expedients. Using a bivalve speculum, which brings the os uteri down within easy sight and reach, seize the margin of the os with a Sims' hook or a vulsellum, so as to steady and hold open the cervix for the passage of the styptic; or the tube (Fig. 52, p. 164) answers better still. By it the styptic can be carried directly into the uterus.

The perchloride or persulphate of iron should be used very strong, nearly concentrated. The chromic acid crystals should be simply moistened with a little water. This is a very powerful styptic. The nitric acid should be used fuming. The acid mostly acts as a superficial styptic or caustic.

Dr. Savage extols strong tincture of iodine. If we find swabbing inefficacious or not to be carried out, then the best thing to do is to inject a solution of persulphate or perchloride of iron. Of course it is eminently desirable that the cervix should be dilated; but we are supposing this not feasible, and that the hæmorrhage is so serious as to threaten life. In such a case a vulcanite tube may be passed into the uterus, and two or three ounces of a solution of perchloride of iron or of the persulphate may be injected by means of an india-rubber ball which can be adapted to the tube. This will rarely fail. I have saved several lives by this treatment. Dr. Kidd, I am bound to state, says that, "in his experience the injection of perchloride of iron is the least useful and the most dangerous treatment. The last case in which he tried it proved fatal. The woman got a low form of metritis and died." I have not myself seen any ill effect from it. I have cited in detail the history of a case ending fatally from injection of perchloride of iron into a uterus dilated by retroflexion. But surely we ought not to be deterred by this risk from the immediate and urgent duty of saving a woman from bleeding to death.

Should bleeding have brought the patient to extremity, there is still a resource in transfusion. Dr. Gentilhomme relates an interesting case (*Gazette Hebdomadaire,* 1868) in which life was saved by this operation.

The preceding means should be steadily persevered in, combating symptoms as best we can, striving to support the patient against them until the climacteric period, when we may reasonably hope that the tumours will pass into degeneration or atrophy, or at any rate become inert. It is only when the patient's condition is so serious that we cannot afford to temporize, and these means can no longer be trusted to, that we shall be justified in resorting to the more decided but more hazardous surgical proceedings which we have now to discuss.

We have lastly to consider *the means of getting rid of the tumours altogether.* This embraces the discussion of the various proceedings available for promoting their expulsion; for causing their destruction and elimination by setting up inflammation or necrosis; for ablation by enucleation, avulsion, ligature, knife, scissors, écraseur, cautery; and for removing the uterus itself along with the tumours by gastrotomy.

The idea of *enucleation* seems to have been first clearly discussed by Velpeau. It was practised by Amussat, and had some vogue afterwards. L. Boyer, A. Bérard, Maisonneuve, Lisfranc practised it. But numerous fatal issues brought it into discredit. It has been several times revived. Simpson especially may be mentioned. And quite recently several enterprising surgeons have renewed the practice. Were it possible to collect faithful reports of all the cases in which the operation has been attempted, I fear we should not derive much encouragement to persevere in this direction.

The tumours justifying attempt at enucleation may, as Atlee describes (*Trans. of International Med. Congress, Phila.*, 1876), be classed under, 1. Tumours already polypiform and in the vagina, or tending to pedunculation and still remaining within the uterine cavity. 2. Interstitial submucous fibroids; 3. Interstitial fibroids proper.

1. *Fibroids more or less pedunculated.*—The means for bringing about enucleation and expulsion may be conveniently described together. The larger tumours whose texture is continuous with the uterine wall, are not proper subjects of these proceedings. It is from not bearing in mind this fact, which has been so distinctly insisted upon by Rigby and McClintock, that failure and disaster have so often followed surgical proceedings. And since the difficulty of diagnosis between these and the encapsuled tumours is great, the subject is involved in doubt at the very threshold. These processes, then, are chiefly, if not exclusively, applicable to the hard fibroid bodies which are encapsuled. Expulsion may be accomplished without enucleation. This occurs in those cases where the tumour is thrust out of the wall of the uterus, becoming a polypus. A polypus after hanging for a time by a pedicle may be thrown off altogether, a thin capsule of uterine tissue carried before it still investing it. Or expulsion may be effected by spontaneous enucleation. The investing capsule may ulcerate, and uterine contraction going on, the tumour loosened, may be thrown out.

The processes of expulsion may be aided by the use of so-called oxytocic remedies. Treating the tumour-bearing uterus as we would the child-bearing organ, we give certain remedies that possess the property of provoking or strengthening the uterus to contract. The chief of these are ergot, quinine, strychnine, galvanism. The action of these agents upon the uterine muscle, even in the non-pregnant state, is undoubted. But they cannot be expected to act so efficiently as in pregnancy when the muscular fibre is highly developed, and when the nervous centres are in a peculiar state of tension ready to respond to comparatively slight excitation. The remedies must therefore be given over a considerable space of time. And generally they cannot be trusted to alone. It is commonly necessary to dilate the cervix freely by incisions and tents; and if we find the tumour or tumours projecting into the uterine cavity, to seize them with a vulsellum, to draw them down, to try enucleation by scratching through the capsule at the margin of uterine attachment, or even by aid of scissors making nicks into its substance. Under this manipulation of combined traction and incisions, the tumour will sometimes come away. But this result will rarely be accomplished at the first trial. Several sittings may be necessary. If the attachment be very firm it is not unlikely that in dragging down the tumour partial or complete inversion of the uterus may be caused. In such a case the greatest care is necessary in the subsequent steps. In applying a wire we might easily include a portion of the body of the uterus. This has been done with a fatal result. The space between base of tumour and uterus may be too short and ill-defined to admit of the adjustment of a wire. In such a case Atlee's advice is to divide the capsule high up and attempt enucleation.

Where the tumours seized with the vulsellum can be surrounded at the base with a wire, it is best to remove what we can by the écraseur. In some cases if the loop of wire can be made to bite beyond the equator or greatest diameter of the tumour, when the screw is turned on the loop naturally closing in on the farther or uterine side may actually effect enucleation.

The wire used for this purpose should be firm, like a piano-cord, of steel, so that the loop can be passed into the uterus compressed in an elongated form, and will open out again when released from pressure into an oval or circular shape that will run over the tumour. Carried in an écraseur the end of this instrument is pushed on to the base of the tumour, whilst a finger applied to the wire-loop guides this down over the tumour until it has got beyond the greatest diameter; and then the loop is drawn in by the screw and made to divide the tumour at its base (see Fig. 164, p. 811). The tumour may then be taken out by the vulsellum or the fingers. When the wire loop cannot be slipped over the tumour by the finger, it is convenient to use a little crutch on a long stem, which seizing the wire can be made to push it up towards the fundus of the uterus.

2. *Sessile or Sub-mucous Fibroids.*—Enucleation failing, the tumour will be divided by the wire flush with the inner surface of the uterus. Then one of three things may happen: 1. The tumour may heal, cicatrize at the incised surface; but the hæmorrhage will in all likelihood cease, and relief be gained for a time. To lessen the risk of hæmorrhage a plug of persulphate or dialyzed iron should be applied after the operation. 2. Slow inflammation or necrosis is set up in the attached portion of the tumour, and its capsular attachments losing their vitality, the tumour is cast out. During this process, there is sometimes continuance of pain due to the spasmodic action of the uterus, offensive serous discharge, and possibly some degree of irritative fever. All this trouble ceases when the residuum of the tumour is expelled. 3. Inflammation may extend from the tumour to the uterus itself, and pyæmia added to metritis may try the constitution to the utmost. But this third event is exceptional. These tumours bear a great deal of rough handling without entailing any serious consequences. During this pro-

cess aid should be sought from the expulsive action of ergot and quinine. These agents further give some protection against septicæmia; and twice daily the uterus should be washed out with a stream of carbolized water or a weak solution of iodine.

In some cases enucleation of even large tumours may be effected by the hand alone or aided by the knife or scissors. After free dilatation of the cervix has been secured, a hernia knife guided by a finger *in utero* makes a long incision into the projecting part of the tumour dividing the capsule. Then the finger insinuated between the solid tumour and its investment may shell it out.

In other cases more difficult, we may succeed in removing a large tumour, one even too large to be drawn unaltered through the pelvis by the process called "spiral elongation." Seizing the most accessible part of the tumour by a vulsellum, and by its means dragging the tumour as near the vulva as possible, aided by supra-pubic pressure by an assistant, a series of incisions are made in the tumour in a spiral or oblique direction. Under the combined effect of dragging and these incisions the tumour is drawn out, it elongates, so that fresh incisions can be carried successively into higher parts of it, until we reach the last part, when all comes away. I have practised this operation successfully.

Sometimes the removal of a tumour can only be effected piecemeal. Wedge-shaped pieces are cut, or torn away, or the écraseur takes away portions successively. In this manner, removing gradually the obstructing parts of the tumour, we work towards the base. Analogous to this method is "gouging" practised by Baker Brown.

Bleeding seldom complicates these proceedings in a dangerous degree. When it is at all copious it may be arrested by swabbing the surface with perchloride of iron, nitric or chromic acid.

It has been sought to bring about the destruction of a fibroid tumour and its enucleation by the action of *caustics*. Simpson thus made an opening in the capsule of a tumour at the most depending point; ergot then exciting uterine contraction, the tumour was gradually driven down through the opening and it was eventually taken away by the hand. The patient died of pyæmia on the sixth day. Koeberlé inserted perchloride of iron into fissures made by incisions.

Actual Cautery—"Igneous Hysterotomy."

Dieulafoy, of Toulouse, in 1848, destroyed an intra-uterine fibroid, after dilating the cervix, by thrusting into it a red-hot iron. Recovery ensued. Abeille (*Traitement des Maladies*

Chroniques de l'Utérus) cites other examples. Abeille again (*Fibromes Interstitiels de l'Utérus,* 1878) relates six cases of his own, all successful, in which he enucleated tumours by red heat. Greenhalgh related five cases (*Medico-Chirurg. Trans.,* 1876); of these three recovered, not without threatening danger, and two died, one of peritonitis and one of embolism. It is contended that to attack these tumours by actual cautery is safer than by other means; that the risk of sloughing and of septicæmia is less. This is probably true; but the proposition must be accepted with reserve. In attempting the enucleation of an encapsuled tumour by cautery, necrosis of the tumour is a necessary condition; and it does not seem certain that necrosis started by cautery can be more exactly controlled than can necrosis started by other means. This danger attends all attacks upon the structure of these tumours.

3. *The Interstitial Fibroids proper.*—Unless life is threatened by otherwise uncontrollable hæmorrhage, operative measures must be refrained from. They often attain great size. As Atlee says, it is precisely in these cases that the hypodermic injection of ergot is the most effectual. He recommends that the ergot should be used periodically in anticipation of the menstrual effort, associating with it the continuous use of chloride of ammonium. In extreme cases of hæmorrhage, Atlee advises "a bold free incision through the muco-muscular envelope of the tumour and through its proper coat, burying the knife into the fibroid substances. This will commonly arrest the bleeding. Enucleation may then be tried."

Atlee, in a "Report on the Surgical Treatment of certain Fibrous Tumours of the Uterus heretofore considered beyond the resources of art," published in 1854, described a method for bringing about destruction by disintegration of the tumour as a part of the process of enucleation. "A section made through their thin investing membrane will sometimes be followed by the death of the whole mass. This may be owing to the admission of air causing it to degenerate. Indeed it would appear that the action of the oxygen of the air, like a portion of yeast in a fermentable mass, may originate in any part of a fibrous tumour an action of eremacausis which may extend throughout the whole." It is needless to discuss the theory here expressed as to the process by which the vitality of the tumours is destroyed. The important point is to examine the results. The history of the cases reported in this memoir did not afford much encouragement to follow the practice. The real process is no doubt the low kind of inflammation leading to necrosis, to which we have so often alluded.

The Removal of Ovarian Stimulus by so-called "Normal Ovariotomy."—Assuming that uterine tumours are governed in their growth by the ovarian function, it might be expected that the removal of the ovaries would arrest the growth and promote the retrogression of uterine tumours. Acting on this hypothesis, the ovaries have been amputated. Battey, who seems to have been the first to propose, or at least to practise "normal ovariotomy," did so with the view of relieving various disorders, nervous especially, associated with aberrant ovarian function. He reports ten operations, in some of which one, in others both ovaries were removed. In one case he operated by abdominal section, in the rest by the vagina, opening Douglas's pouch, drawing down the ovary, cutting it off by scissors or écraseur, and securing the stump by ligature. Two of his patients died. In five, distinct benefit was obtained. In two or more it was found that the ovary was in an early stage of cystic degeneration. One case bears upon the present discussion. A woman, aged thirty-eight, suffered from "threatening mania." Both ovaries were removed by vaginal incision and écraseur. The mental condition was "strikingly improved." The uterus, which was of full size at the time of the operation, and continued so for a year afterwards, in the succeeding eighteen months underwent an extraordinary hyperinvolution, until it was no larger than that of a child six years old" (*American Gynæcol. Trans.*, 1876).

Hegar (*Med. Times and Gazette*, 1877) has in two cases removed both healthy ovaries, in order to bring on the climacteric, and so stop hæmorrhage from uterine fibromas. Both patients recovered. Nine months afterwards the hæmorrhage had not recurred, and the fibroids were reduced in size. Trenholme (*American Gynæcol. Trans.*, 1876) reported a successful case in this connexion. Marion Sims (*Med. Times and Gazette*, 1877) has also written favourably of the proceeding.

It is perhaps premature to offer an absolutely adverse opinion upon this operation. Peaslee and Emmet, speaking from observations *ad hoc*, as well as with the authority justly due to their vast general experience and their steady judgment, accorded it only a qualified sanction. With reference to the application to uterine fibroids, it must be admitted that it is supported by physiological facts, and to some extent by clinical experience. It may be justified as a less severe proceeding than the entire removal of the uterus in some extreme cases where this measure would otherwise appear to offer the last hope; and perhaps in some cases even less urgent. But in these cases the comparatively simple proceeding of removing the ovaries through the vagina would rarely be practicable. Laparotomy would be necessary; and this being done, the opportunity of judging whether it would not be preferable to remove the uterus as well would be present to the operator.

4. When tumours—and here we are mainly concerned with the fleshy and fibro-cystic kinds—are so large as to forbid attack

by the vagina, and yet are endangering life by hæmorrhage, by pressure, or other processes, the *ultima ratio*, removal of the uterus and tumours *en masse* from above by means of abdominal incisions, may become justifiable.

Péan and Urdy* trace the history of *laparotomy* for the removal of uterine tumours through three distinct periods. The first, which comes down to 1843, comprises those cases in which surgeons having opened the abdomen with a view to ovariotomy, finding the tumours to be uterine, shrank before the consequences of amputation of the uterus, and closed the wound. In the second period, that of trials and groping, which comes down to 1863, during which ovariotomy had made great strides, several surgeons, Atlee, Heath, Charles Clay, Parkinson, finding uterine tumours where they expected ovarian, yet did not hesitate to remove the uterus. In the third period, beginning with April, 1863, Koeberlé, in the presence of a doubtful case prepared for either ovariotomy or hysterotomy. Storer, Péan, and others deliberately resorted to laparotomy for the purpose of removing the uterus.

Between September, 1869, and February, 1872, Péan had performed the operation five times for fibrous tumours of the uterus, and four times for fibro-cystic tumours, with the result of two deaths out of the nine cases. One death is ascribed to retro-uterine hæmatocele on the eleventh day; the other to shock, fifty-seven hours after the operation. He gives a table, intended to be complete, of forty-four cases performed down to 1872, including those of Koeberlé, of which fourteen recovered, and thirty died. But this list is certainly not complete.

Before performing the operation the same general preparations which are practised before performing ovariotomy are indicated. The time to be selected should be within a week after a menstrual period.

The instruments required are the same as for ovariotomy. But there should be provided in addition several powerful *serre-nœuds,* such as those of Dr. Cintrat, and wires of different sizes.

Since much cannot be gained by lessening the bulk of the tumour, the abdominal incision must generally be longer than is necessary for ovariotomy. When the tumour comes into view, the extent to which its volume can be lessened must be considered. If there are cysts, these must be punctured. If it is solid, and too big to come through the wound, the process of cutting up, "*morcellement,*" of the tumour must be resorted to. This is effected by piercing the middle part of the tumour, or if that cannot be done, the most accessible part, by several metallic wires, and tightening them by *serre-nœuds*. These *serre-nœuds* resemble small wire écraseurs. The circulation through the part above the ligatures being thus stopped, this part may be freely cut away, and the surgeon may proceed to deal with the rest.

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* "Hystérotomie : Étude sur les tumeurs qui peuvent nécessiter cette opération." Paris, 1873.

Péan insists that the success of the operation depends upon securing the peritoneum from the entry of fluids into it. Hence if a cyst is to be opened it is first drawn outside the abdomen. In separating adhesions like care is extended to obviate bleeding into the peritoneum. Small bleeding vessels are tied with silk, and the ends cut short. The actual cautery by aid of the cautery-clamp should be used to sever parietal or omental adhesions.

When the tumour has been drawn out of the abdomen the question of how best to amputate it will be decided by the conditions of its connexions. If attached by a small pedicle, it may be clamped like an ovarian tumour, or ligatured by traversing the pedicle by two wires or pieces of whip-cord to be drawn tight by *serre-nœuds*. If the pedicle be large, and have a very broad attachment to the uterus, it becomes a question whether the immediately involved part of the uterus or a greater part of the organ shall be removed. Péan advises in this case to remove the uterus at the neck. Besides having lost two cases in which he confined himself to removing only a part, whilst he saved those in which he practised amputation at the neck, he gives the following good reasons for adopting the latter course: In the cases which compel resort to laparotomy, the uterus is always hypertrophied, perhaps otherwise diseased ; a much larger surface must be divided and exposed in removing a part of the body of the uterus than by amputating at the neck, laying open large sinuses which favour pyæmia ; and the supra-vaginal amputation is really easier.

In another class of cases the relations of the tumour are such that there is no choice but to remove the whole uterus. By catheter in the bladder the relation of this organ to the neck of the uterus is made out ; this part is traversed by two straight, rigid needles, perpendicularly to each other, preserving as long a pedicle as convenient. This done, a strong curved needle notched at the end is passed through the pedicle or uterine neck *immediately above* the most superficial of the two straight needles traversing the pedicle. The notch catches a metallic thread which, being brought through by its loop, forms a double ligature. These are then tightened by the *serre-nœud*. If the part be very vascular another ligature may be passed *beneath* the two straight needles. The uterus may then be removed. There is no valid reason against removing the ovaries along with the uterus. The end of the stump is brought outside the abdomen, the four ends of the straight transfixing needles and the ligatures rest upon the abdominal wound, and the wound is closed as after ovariotomy. The after-treatment resembles that for ovariotomy.

The case, of which Fig. 158 is an illustration, affords instructive evidence of some of the effects of large uterine tumours. The case is recorded at length in my Memoir on "Retro-uterine Tumours," in *St. George's Hospital Reports,* 1877. The subject had been married several years without becoming pregnant. At last severe pelvic distress, retention of urine, fever, and peritonitis set in. The pelvis was found blocked by the tumour. It could not be dislodged. Laparotomy was performed and the whole uterus was extirpated. The drawing is an accurate representation of a section. The uterine cavity is seen locked between two tumours. A fœtus of two and a half months' development was found in it. The larger or intra-pelvic tumour

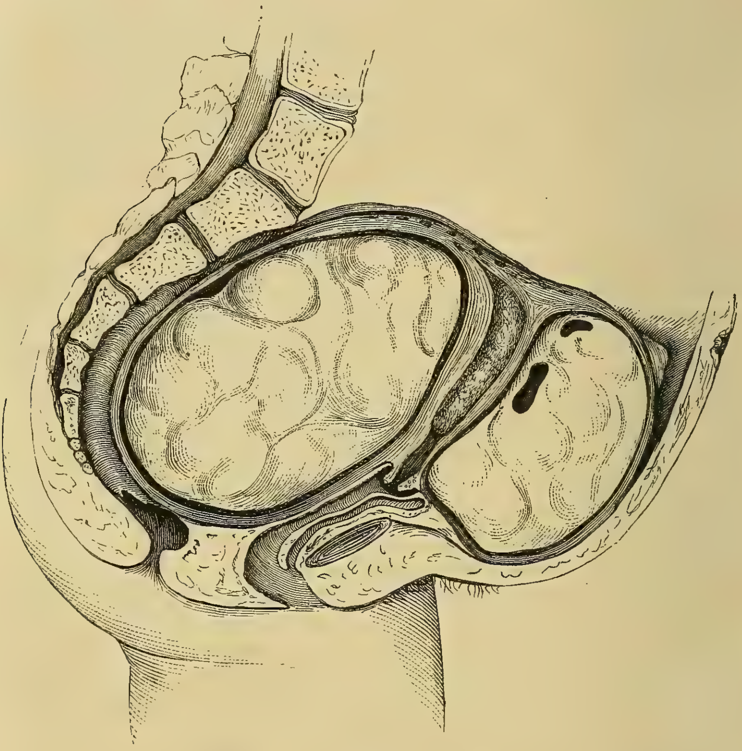

Fig. 158.

LARGE FIBROID TUMOURS, ONE IN THE ANTERIOR, THE OTHER IN THE POSTERIOR WALL OF THE UTERUS, THE WHOLE REMOVED BY LAPAROTOMY. PREPARATION IN ST. GEORGE'S MUSEUM (R. B.).

had fallen into necrosis. The woman seemed relieved by the operation for a time, but sank from exhaustion in thirty-six hours. The preparation is in St. George's Museum; and it is a matter of interest to note that in the same museum is a preparation nearly like it, excepting that the uterus was not pregnant.

It is right to repeat that the justification for attempting enucleation, avulsion, or other mode of removing large fibroid tumours will rest upon—1. Uncontrollable hæmorrhages endangering life; 2. Signs of sloughing or decomposition of the tumour, with present or threatening peritonitis or pyæmia; 3. Dangerous pressure upon the bladder and rectum; 4. Such great size as to cause dangerous pressure upon the abdominal and thoracic viscera. Life must be unmistakably threatened.

The same conditions threatening life, and removal by the processes above enumerated being precluded, may justify the last resource, that of laparotomy and removal of the uterus.

The case is analogous to dystocia. If we cannot effect delivery through the pelvis, we resort to laparotomy. And this must be the rule of action in dealing with uterine fibroids, *assuming always that extirpation is necessary.*

The time has not yet come for forming a confident opinion upon the practice of laparotomy for the removal of uterine fibroids either alone or with the uterus. At present there is little ground for enthusiastic advocacy of the practice. The case may best be summed up by stating that the question is *adhuc sub judice.* We must for a while be content with the divided opinions expressed in the Academy of Medicine on the occasion of a report presented by Demarquay on Memoirs by Koeberlé, who advocates the proceeding, and by Boinet, who condemns it. Boinet showed that the operation had for the most part been performed accidentally in cases mistaken for enlarged ovary; that it could not be defended on the same grounds as ovariotomy; that it should always be rejected when the tumour was not pedunculated, and especially when it involves the entire or partial removal of the uterus. Demarquay agreed with Boinet.

On the other hand, Richet cautioned the Academy against pronouncing any summary condemnation of an operation which at present is dreaded as ovariotomy once was.

Thomas (1874) summed up twelve recent cases observed in America; of these eleven died. Pozzi tabulates seventy-five cases, not counted by Péan; of these forty-eight died. The causes of death were: hæmorrhage, peritonitis, shock, fibrin-concretion in the heart, septicæmia, exhaustion. I have seen death from all these causes. Another cause of death is intestinal obstruction (Broca and Dolbeau).

If decomposition of a tumour have begun, and constitutional symptoms from absorption appear, a decided attempt at least should be made to bring away the tumour. The patient being under chloroform, the hand *in utero* may effect detachment unaided, or scissors or scrapers may be used to divide any bands or connexions.

In conclusion it may be stated that the question will be decided, like ovariotomy, by experience; but to acquire that experience justifiably, extreme caution, judgment, and conscientiousness, as well as surgical skill are required.

CHAPTER XXV.

POLYPUS UTERI.

DEFINITION; FORMS OF: FIBROID OR MYOMA; GLANDULAR OR MUCOUS; HYPERTROPHIC; VASCULAR; PLACENTAL; FIBRINOUS; HISTORY OF FIBROID; FIBRO-CYSTIC VARIETY; SYMPTOMS; TERMINATIONS; INTRA-UTERINE AND EXTRA-UTERINE POLYPI; DIAGNOSIS; TREATMENT; SLOW STRANGULATION, DANGERS OF; TORSION, CRUSHING, AND EXCISION BY SCISSORS; REMOVAL BY POLYPTOME, ÉCRASEUR, GALVANIC WIRE-CAUTERY.

Definition.—Under the name of polypus are included all tumours, stalked or sessile, which hang from the inner wall of the uterus or vagina. It is, however, convenient to exclude cancerous growths and the cauliflower excrescence. A polypus of the uterus may be defined as a uterine tumour in process of extrusion from the mucous surface. This chapter then is the clinical continuation or complement of the preceding chapter, which treats of non-malignant tumours of the uterus.

In the greater number of cases of clinical interest, a polypus is nothing more than a tumour in one of its ulterior stages. We have seen that the fibroid tumour is liable to be extruded from the wall of the uterus into the cavity. In this process of extrusion, a stage arrives when the tumour becomes first sessile, then pedunculated. When the main bulk of a tumour projects into the uterine cavity, its seat of attachment being narrower than its equator, the tumour has become a polypus. This definition, especially true of fibroid polypus, is generally true of the other forms. But Cruveilhier's distinction is useful. He divides polypi into—1. *Stalked.* 2. *Sessile.* In the stalked kind the polypus is nearly or quite distinct from the proper tissue of the uterus. The stalk consists mainly of the stretched mucous membrane, connective tissue, and perhaps a little muscular fibre. This is most frequently the case with the hard tumours. In the sessile polypus we are more likely to find a broad continuity of muscular tissue between tumour and uterine wall.

Polypi, like ordinary tumours, differ in their histological structure, and in their situation and other clinical characters. The source of a polypus will commonly be an indication of its anatomical character. This is the consequence of the law that like tissues produce like outgrowths. For example, the muscular wall of the body of the uterus produces the fibroid or myomatous tumour or polypus. The cavity of the cervix and the os uteri produce mucous, glandular, or cystic polypi.

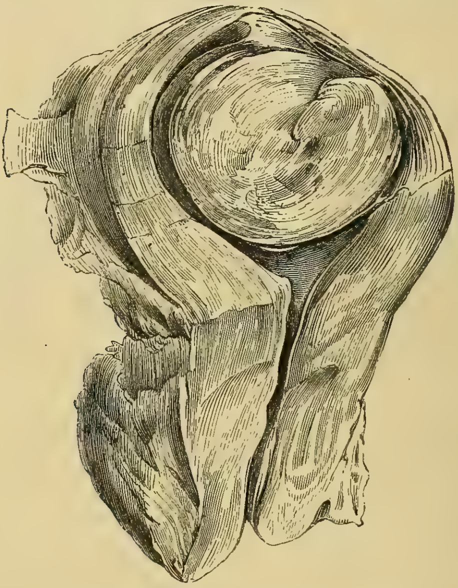

FIG. 159.—(Ad Nat., Coll. of Surgeons, No. 2666.)

FIBROID POLYPUS FILLING THE CAVITY OF THE UTERUS (R. B.).

In this case the wall of the uterus is much thinner where the tumour is attached.

The varieties of polypi are then, *a.* The fibroid or myoma; *b.* The glandular or mucous; *c.* The hypertrophic polypus of the cervix; *d.* The vascular; *e.* The placental; *f.* The fibrinous.

a. The form which most frequently comes under clinical notice is the *fibroid or myoma.* The structure and history of this form are described in the preceding chapter on tumours of the uterus. It is only necessary here to trace those clinical features which are peculiar to the polypoid character. It mostly springs from some part of the wall of the body of the uterus, generally from the fundus. Projecting into the cavity of the uterus and preserving organic connexion with this organ, it acts in two ways—1st, it irritates as a foreign body; 2nd, it stimulates uterine growth like an ovum. It is a parasitic body. It is upon these two conditions that most of the accidents attending polypus depend. The uterus struggles to cast out the unwelcome guest. Hence spasmodic pains, which are the exponent of the uterine contractions. Hæmorrhage and leucorrhœal discharges occur as the exponent of the increased vascularity and development of the uterus.

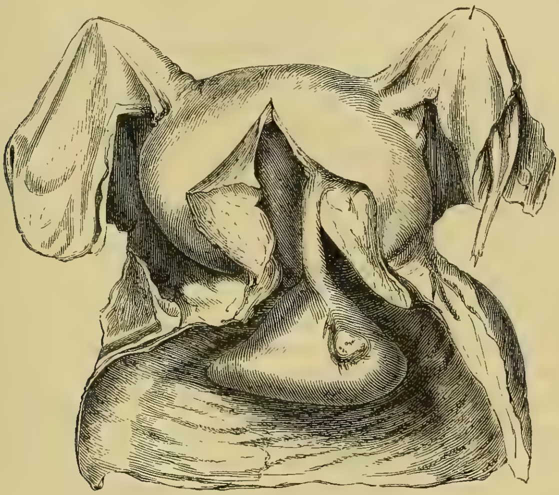

Fig. 160.—(Half-size, College of Surgeons.)

FIBROID POLYPUS WHICH HAS BEEN EXTRUDED FROM THE CAVITY OF THE UTERUS, THE TRIANGULAR SHAPE OF WHICH IT RETAINS (R. B.).

It is attached by a long stalk, the root of which is traced into the wall of the uterus.

Just as we have fibro-cystic tumours of the uterus, so we may have fibro-cystic polypi. The softer myomatous tumour which is more continuous with the proper muscular wall of the uterus may also become polypoid. But this is comparatively rare.

Fig. 159 is a good illustration of a fibroid intra-uterine polypus still sessile.

Fig. 160 is a good illustration of a stalked polypus.

Sometimes instead of forming a pedicle, the tumour is cast out entire.

In the process of extrusion a pedicle is formed which is sometimes capable of elongation, permitting the tumour to descend lower and lower. The thin layer of proper uterine tissue which forms the shell stretches out, and through the stalk, the vascular connexion with the uterus is maintained; at the same time the connexion is further aided by the investing mucous membrane. At other times the connexion is more intimate; the fibroid structure of the tumour is extended into the substance of the uterus, forming a dense, short, unyielding stalk. Under uterine action, since the tumours will not separate, and the stalk will not lengthen, the uterus itself is dragged down, producing partial or complete procidentia of tumour, and vagina, and uterus, and sometimes even inversion.

We may distinguish three stages in the history of polypi. 1. The tumour in process of pedunculation is still retained in the proper cavity of the uterus, or is distending the cervix; 2. the tumour, pedunculated, has escaped from the uterus, and is accommodated in the vagina; 3. in some cases, the stalk much lengthened, the polypus protrudes beyond the vulva.

The symptoms differ in the cases of polypus still retained within the cavity of the womb, and of polypus which has escaped through the os uteri into the vagina. When the tumour is locked up in the uterine cavity, we may have to depend upon the subjective symptoms alone. The general symptoms are these: 1. Hæmorrhage, generally at first in the form of menorrhagia, afterwards liable to recur at any time. This is very common, but not constant. 2. Leucorrhœa of a mucous, purulent, or serous character; at times tinged with blood, and very offensive, owing to the discharges being retained in the vagina and decomposing there. 3. Bearing-down, or expulsive pains. 4. Abrasion, ulceration, bleeding of the os and cervix uteri, from friction of the polypus. 5. Even more serious injury may be caused, as in the following case. Larcher describes a case* of spontaneous rupture of the uterus with intra-uterine polypus. A woman was admitted into the Hôtel Dieu, with pain in the abdomen. After four days profuse bleeding set in. She refused examination. Two days later meteorism and peritonitis appeared, and she died. Section revealed diffuse peritonitis and adhesion of all the organs of the small pelvis. A polypus was found in the uterus, seated in the anterior wall near the isthmus. The opposite side of the uterus was ulcerated, and at one spot torn through, communicating with the cavity of the abdomen. 6. They may cause metritis, and septicæmia. 7. Perhaps some distress in micturition or irritability of the bladder; and in some cases, when the tumour has been very large, so as to compress the bladder and rectum against the walls of the pelvis, symptoms like those of retroversion of the gravid womb have been developed, as retention of urine, urinæmia, and intense pelvic pain. Gangrene and sloughing of the vagina have even been known. 8. When hæmorrhage and leucorrhœa have continued some time, the phenomena of anæmia, blood degradation, impairment of digestion, and disordered nutrition follow. The aspect may become sallow; the patient emaciated; and the discharges offensive. These, together with pain, constitute a series of symptoms that have often given rise to the conclusion that the disease was cancer. 9. There will commonly be enlargement of the body of the uterus, and expulsive pains of a spasmodic character, constituting uterine colic. 10. Another not uncommon symptom is vomiting. This appears to be due to distension of the uterine fibre.

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* "Arch. Gén. de Méd.," Nov. 1867.

When the polypus has escaped from the uterus into the vagina some of the foregoing symptoms are mitigated or cease. The pain is commonly much diminished.

What has been said of the *vascularity* of fibroid tumours and of *the source of the hæmorrhage*, applies to the fibroid polypus. This is rarely very vascular in its substance. But the investing mucous membrane is commonly very vascular. A network, chiefly of veins, is formed in it, from which blood easily oozes in profusion at the menstrual periods, and under injury to the surface.

Occasionally, however, vessels of considerable size have been seen penetrating the substance of fibroid polypi. The growth of fibroid polypi, like that of fibroids still imbedded in the uterine wall, is stimulated by the ovarian or menstrual nisus, and still more actively by pregnancy, obeying the same impulse as that which governs the cognate muscular tissue. In like manner they are disposed to undergo a similar retrogression or decline when pregnancy has passed, and even atrophy or calcareous degeneration when the period of menstrual life has ended. Hence the bony or stony polypi of Gerdy (*Des Polypes, et de leur Traitement: Paris,* 1833).

But this post-climacteric retrogression is not constant. The tumours may even continue to grow.

As to the consequences of polypi, much variety is observed. Velpeau (*Journ. de Méd. et de Chir. Prat.,* 1859) says they are sometimes harmless, and that the consequences are not in relation with their volume. Some disappear spontaneously. They may be found loose, or may drop off unperceived. But commonly repeated hæmorrhages induce such a degree of anæmia, that even death follows if the tumour be not removed. And this danger is greatly increased if pregnancy supervene. (See fatal cases in Gooch, p. 145) Dr. Cockle relates (*Med. Times and Gaz.,* 1863) a case of a large, pedunculated, fibrous polypus attached near the fundus uteri, distending the uterus and vagina, and giving rise to frequent bleedings and offensive discharges. The patient died after symptoms of peritonitis from perforation. The ovarian extremity of the right Fallopian tube was found distended by the discharge, some of which had escaped into the abdominal cavity. Many patients have died exhausted by bleeding caused by an intra-uterine polypus not suspected during life. In a memoir on "Uterine Polypus," (*Lancet*, 1854), I narrated a very instructive case. The patient was twenty-six years of age; she began to menstruate at the age of fourteen, and this function was performed very regularly until her marriage, eight months ago. From that time she had suffered almost perpetual hæmorrhage; the flooding was so profuse that it was thought she had miscarried. She had strong bearing-down, expulsive efforts. The patient died the same night in convulsions, evidently from loss of blood. There was no inflammation. The os uteri was healthy, but flaccid; it was filled with a fresh clot. There was also blood in the cavity of the uterus. The walls of the uterus were dense, pale, somewhat thicker than natural, and the whole size of the organ somewhat larger than the normal unimpregnated womb. Attached to the inner surface near the fundus, and altogether enclosed within the cavity of the uterus, was a tumour of the size of a small walnut. The mucous membrane of the uterus was stretched over it. It was connected by a broad basis to the uterus, but would have admitted of isolation by ligature. The apex, or most projecting part, had undergone partial disintegration; it was a little broken up, softened, and had evidently quite recently been the source of hæmorrhage. The tumour was fibroid. The woman had probably aborted as well.

When pregnancy supervenes, the presence of the polypus is a source of serious danger. The tumour partakes of the general development and increased vascularity of the uterine wall. In this state injury inflicted upon it is more severe in its consequences; inflammation and necrosis, for example, are more liable to follow. To anticipate the spread of morbid processes from the tumour to the uterus, it is best to remove the tumour by the wire écraseur as soon as its presence is discovered after the labour. The history of this complication is pursued more fully in my *Obstetric Operations.*

It is desirable to bear in mind that polypus may be a cause of abortion. Generally, however, polypi prevent pregnancy. A curious case occurred to the writer of a uterus removed in the dissecting room in which a polypus the size of a filbert grew at the orifice of each Fallopian tube, both being completely closed. In another case the tumour had been driven outside the vulva, closing the entrance to the vagina. In the case of polypus filling the vagina, sterility almost necessarily follows.

b. The *glandular* or *mucous* polypus generally grows from the os uteri, varying in size from a filbert to a walnut. It is smooth and vascular, and contains in some instances a curdy matter, or yellowish viscid fluid. Herbiniaux described this form. It is not uncommon. There is a remarkable example in the Middlesex Museum of a cyst which appears to have been produced in this way. They generally grow from a broad basis, rarely becoming stalked.

Klob and Paget thus describe the production of glandular polypi. The mucous membrane of the cervix is denser than that of body of the uterus. 1st. The glands degenerate into vesicles situated either in the borders of a single transverse fold, or when developed parallel on several such folds, arranged into rows. Or 2ndly. The degenerated glands are formed chiefly along the longitudinal folds, like a string of beads. One of these small cysts then becomes more prominent, forming a round protuberance, an excresence which contains the gland degenerated into a cyst. Dr. Andrew Clark, when my colleague at the London Hospital, gave me a similar description of a specimen I submitted to him.

An illustration of one form of mucous polypus is seen in Fig. 161. The patient was subject to profuse hæmorrhages and leucorrhœa.

They often attend chronic metritis, especially of the cervical portion. They induce great hyperæmia, and give rise to profuse bleedings. Being small, soft, and easily retreating within the os uteri, they readily escape detection by touch. The speculum is sometimes necessary to reveal them. They project as stalked little tumours on the red, abraded margin of the os uteri, but are occasionally seen higher up the cervical canal. They range in size from a quarter of an inch to half an inch long, and sometimes they exceed this. On pressure, as in trying to seize them with a forceps, they easily break up. They are the result of a morbid condition of the cervix. They contain a viscid fluid, and thus may be identified with their glandular origin. But some are really papillary outgrowths. These latter are especially vascular.

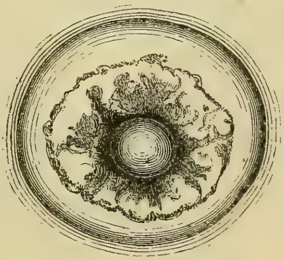

FIG. 161.—(Ad Nat.)

MUCOUS OR GLANDULAR CERVICAL POLYPUS, CAUSING ABRASION OR ULCERATION IN ITS NEIGHBOURHOOD (R. B.)

The so-called "channelled" polypus of Oldham appears to be a variety of the glandular polypus, although the fibro-cystic tumour may put on the appearance of channels.

Fig. 162, for which I am indebted to Henry Arnott, shows the histological characters of these outgrowths. It exhibits the proliferating connective tissue with imbedded, winding gland-ducts, lined with columnar epithelium.

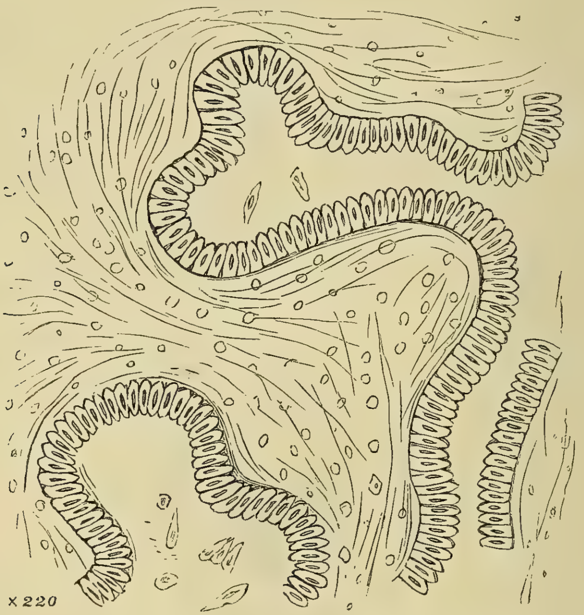

Fig. 162.—(H. Arnott.)

SECTION OF A "CHANNELLED" GLANDULAR POLYPUS, SLIGHTLY DIAGRAMMATIC.

c. The *hypertrophic polypus* of the cervix uteri. Although most polypi may in some respects be regarded as hypertrophies of ordinary structures, there is one form to which the name seems to me to be more especially applicable. In a memoir* on the "hypertrophic polypus," I have described as frequent the outgrowth of dense fibrous polypi on the edge of the os uteri in cases of prolapsus. So frequent is this coincidence that one is naturally led to conjecture either that a common cause produces both, or that one entails the other. It can hardly be that polypus is the cause of hypertrophy of the cervix, for in the majority of cases of hypertrophy there is no polypus. The truth appears to be that that excessive growth which results in hypertrophy, sometimes produces polypus as well.

These polypi are generally small, sometimes not larger than a pea, sometimes they are as large as a cherry; they may be round, but are occasionally elongated, cylindrical, but more or less irregular in form. (See Fig. 119, p. 638.) They easily escape detection by the finger; hence it often occurs that their existence is first revealed by the speculum. They generally begin to form just inside the ring of the os uteri, and growing first inwards, the hypertrophied os uteri conceals them and protects them from the touch. When they have existed some little time, have increased in size, and have frequently caused hæmorrhage, they sometimes descend below the edge of the os uteri, and may then be felt like a hard pea by the finger. But before this stage they can often be seen through the speculum, especially through a good bivalve which makes the os gape widely when applied. They are commonly single, but it is not infrequent to find two or three; and some show a disposition to subdivision or rather to lobulation. They entail the common consequence of other polypi, namely, hæmorrhage. It is this symptom which mainly leads to examination and their detection. Generally their removal is followed by diminution or cessation of the hæmorrhage; but here the benefit of the operation ceases. The distress which properly belongs to hypertrophy continues.

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* "St. Thomas's Hospital Reports," 1872.

The pathological history of those "hypertrophic polypi" may, I think, be told as follows: The first condition of their existence is hypertrophy of the cervix uteri. This hypertrophy we know frequently pursues a very uniform course affecting the whole structure of the cervix alike; but sometimes one lip, and sometimes even a part of one lip, is more especially affected. Thus we sometimes see the anterior or the posterior lip shooting out an inch or more beyond the other. At other times the os uteri being lobulated or fissured, as is seen after labour, one lobe or portion of a lip may take on an exaggerated growth, and project beyond the level of the rest of the os. In such a case, if studied by the light of observation of more advanced or completed polypoid formation, we may see the origin of the hypertrophic polypus. A small lobe more or less marked out on the os by a fissure or depression on either side continues to grow under the same stimulus that determines the general hypertrophy of the cervix. It grows a little more quickly; then, its base being compressed by the firm structure of the os on either side of it, is squeezed and elongated until it assumes the characteristic polypoid shape. All this, I think, I have been able to trace in the successive stages in different cases.

The structure of these hypertrophic polypi of the cervix uteri entirely accords with this theory of their formation. It is identical with that of the hypertrophied cervix from which the polypi spring. The mucous membrane with which they are covered presents exactly the same elements as the mucous membrane of the corresponding part of the cervix or os uteri. If they are attached within the cervix, we find columnar and ciliated epithelium-cells. If they are attached to the outer edge of the os, then we find chiefly large squamous epithelium-cells. The interior in both cases is composed of bands of smooth fibres like those of the unimpregnated uterus.

I removed by galvano-cautery a hypertrophied lip of an os uteri, and received from Dr. John Harley the following report of its constitution: "It contained one or two little cysts, natural follicles enlarged, full of glairy mucus consisting of normal mucous corpuscles. The mass was composed of the usual uterine structures, that is, interlacing bands of smoother fibres." These facts I had often observed myself, but was glad to find them verified by my colleague.

d. The *vascular polypus* takes its rise from a dilatation or varicosity of the vessels running under the mucous membrane. All these three forms are found in the cervix or os uteri. Amongst conditions simulating polypus may be mentioned a mushroom-like hypertrophy of the os uteri. It is referred to by Dance, Bérard, Cruveilhier, Mayer, Meissner, Malgaigne, and Montgomery. Malignant growths of the os also often resemble polypus by their form.

e. In addition to the above recognized forms, Rokitansky, Kiwisch, Scanzoni, and C. Braun have described other varieties. C. Braun (1851) describes the *placental polypus.* This results from the remains of the placenta consisting of hypertrophied decidua, which, projecting into the uterine cavity, forms a polypoid mass. Braun relates five cases in which violent hæmorrhage broke out some time after delivery. Polypi of the kind described were found. In four cases they were extracted with the finger; in one the polypus separated spontaneously. The *fongosités intra-utérines* of Nonat, according to Stadtfeld of Copenhagen, (*Dubl. Q. Journ. of Med.*, 1863) are placental remains. Such a case was sent to the writer by Dr. Woodman. Arthur Farre (*Todd's Cyclop. of Anat.*) says he has satisfied himself of the correctness of Heschl's opinion, which agrees with the above, upon the formation of the placental polypus.

Malgaigne describes "*multiform polypi*" containing hair. These must be dermoid cysts.

f. Kiwisch describes *fibrinous polypi.* This author says when menstruation has been retarded six weeks, fibrinous polypi may arise from long persistent hæmorrhage, a kind of apoplexy of the uterus, a large coagulum forming the upper part consisting mostly of fibrine and adhering by a stalk to the uterine wall, whilst the lower part consists of red soft coagulum having a coat of firm fibrin. These polypi always occasion profuse metrorrhagia. Scanzoni, however, does not admit this view. He contends that these are cases of abortion, and would therefore fall under the class of "placental polypi." An ovum after fixing itself in the mucous membrane of the uterus, and after being quite clothed with a decidua reflexa, is soon driven down by uterine contraction into the cervical canal, its attachments lengthening into a stalk by the stretching and growth of their tissues. The embryo escapes, whilst a portion of the membranes or stalk remains, and by accretions of fibrin-coagula forms the basis of fibrinous polypus. McClintock gives an illustration of a dense coagulum simulating a fibrinous polypus.

I have little doubt as to the general correctness of Scanzoni's criticism. There is a preparation in St. George's Museum, described by Dr. Ogle (*Pathol. Trans.* vol. xi.), as a "large mass within the uterus, supposed to be a fibrous tumour, but which proved to be formed by retained placenta and fœtal membranes. A woman died after an operation for femoral hernia. On removing the uterus a quantity of dark semi-coagulated blood, along with some shreddy tough material, was found protruding from its orifice. A firm substance was found filling the cavity of the uterus. Excepting at its upper part, where it was, as it were, continuous with the muscular structure of the uterus, its whole extent was free. It consisted of placenta. No fœtal growth was discovered. But it was evident that the growth had been retained a long time."

The diagnosis of a polypus which has emerged from the cavity of the uterus is usually not difficult. The sources of fallacy are chiefly prolapsus of the uterus, and inversion. Confusion is only possible when the tumour resembles in size that of the uterus in one or other of these states. A tumour not bigger than a walnut can hardly be mistaken for the uterus. A tumour bigger than an orange is not likely to be the uterus. But tumours ranging between these sizes may give rise to error. The great landmark is the os uteri. In prolapsus this can always be found at the lowest part of the tumour. By passing the sound through the os we shall rarely fail to take exact measure of the uterus. Again, the sensation conveyed to the touch by feeling the body of the uterus through its coat of inverted vagina which can be made to glide over the solid mass within, is very different from a solid polypus felt directly without any intervening coat. The uterus, moreover, is sensitive to compression, whilst a polypus is not.

Complete inversion is distinguished by—1, the absence of an os uteri at the lowest part; 2, by the neck of the tumour being continuous with the roof of the vagina which is directly reflected off from it; 3, by determining the absence of the body of the uterus from its normal position by the combined rectal and abdominal touch, and the other diagnostic manœuvres described and illustrated in the chapter on "Inversion."

Partial inversion, namely, where the fundus of the uterus only comes through the os uteri, is more likely to lead to error. In this case, as in polypus, there is a rounded tumour encircled by a ring, permitting a sound or the finger to pass up between.

See Figs. 144, 145, pp. 722, 723. The following tests will commonly distinguish the partial inversion. The sound will not run more than an inch, perhaps less, beyond the margin of the encircling ring, whereas in the case of polypus it will generally run at one part or another at least two and a half inches. And the manœuvres which define complete inversion are almost equally conclusive in the case of partial inversion. For example, the cup or funnel-like depression of the fundus uteri may be felt through the abdominal wall.

Polypi which have been detected at one time by touch and even by sight, may escape observation at another. It is possible that the polypi may have become detached and expelled. But more often this intermittent appearance is due to the greater relaxation of the cervix, and some contractile action of the uterus attending hæmorrhage or menstruation. Under these conditions the tumour projects through the open os; and retreats when these conditions subside. Commonly polypi are detected, and their size and attachment best made out by the touch. But now and then glandular polypi are discovered by the speculum which had escaped detection by the finger. A good bivalve speculum, by parting the lips of the os uteri, will often enable the sight to explore further than the touch.

An intra-uterine polypus may escape detection unless the cervix uteri be sufficiently dilated to admit the finger. But if the rule I have ventured to lay down, namely, that in all cases of obstinate uterine hæmorrhage, the cavity of the uterus should be explored by dilating the cervix, be observed, we shall always be able to determine the presence or absence of a polypus. And whether the hæmorrhage be due to a fibroid polypus, to malignant disease, endometritis or other cause, not only is accurate diagnosis arrived at, but the way is opened for the most efficient treatment.

It is curious to notice how deceptive is the sensation communicated to the touch by some fibroid polypi. Even under palpation after removal they may give the impression of fluctuation, as if they were cystic and contained fluid, whereas on section they are found quite homogeneous.

A very important practical rule is, in a case of presumed polypus, to trace up the tumour to its attachment before operating. This can generally be accomplished by finger or sound. If the finger can find room to pass along the tumour to its insertion, then by combined abdominal palpation we may get the body of the uterus above the tumour between the two hands. The information so obtained is unequivocal. Where the finger cannot reach, the sound will answer nearly as well. We feel the fundus of the uterus supported on the sound through the abdominal wall, whilst a finger in the vagina distinguishes the tumour.

Were these methods of diagnosis rigorously carried out, error would be almost impossible. But polypus is so common, and inversion so rare, that the mind is taken possession of by the more common event. The rarer event not being contemplated, we readily accept as conclusive in favour of polypus evidence which is really insufficient.

One form of the placental polypus may easily be mistaken for an ordinary polypus. Thus I have been called to cases where the patient was said to be bleeding from polypus, and I have found a mass more or less firm partly projecting from the os uteri, and attached to the inner surface of the body of the uterus. By dilating the cervix by laminaria-tents, these masses were sometimes removed by the finger and sometimes by the wire-écraseur. The structure of the masses removed was found to be the placenta of abortion.

The Treatment.—A polypus, being a tumour in process of spontaneous expulsion, seems to invite surgical assistance. We are simply called upon to complete a cure where Nature points the way. The treatment is generally successful. It constitutes one of the most satisfactory applications of surgical skill. The principal methods resolve themselves into —1, removal by strangulation; 2, by torsion; 3, by various methods of excision.

Palliative or temporizing measures are rarely indicated. If hæmorrhages, leucorrhœa, forcing down, or other urgent local or general distress exist, the indication to remove the tumour is generally imperative. Even if a polypus give rise to no trouble, it is the wiser course to remove it, since it may at any unexpected time be the occasion of mischief.

1. It is convenient in the first place to dispose of *strangulation.* Experience of its dangers, and the perfection to which the proceedings for effecting immediate removal of polypi have been brought, has fairly exploded this method.

The ligature was for a long time applied so as to effect strangulation and slow detachment by sloughing. Levret contrived an instrument consisting of two silver canulæ curved, and so united by a joint that they are shaped like a pair of forceps. A ligature is passed through the tubes, the noose is applied round the root of the polypus, and the ends are then drawn tight, and tightened daily until the tumour drops. A similar instrument is described by Nissen (*De Polypis Uteri.* See *Richter's Chir. Bibl. b. ix. s.* 613). The tubes are brought together by a third double canula, and then the ends of the ligature are tightened. Gooch's well-known instrument is a modification of Nissen's, the tubes being made straight.

Until recent years this method of slow strangulation was generally pursued in cases where the polypus was large and the pedicle thick. The strangulation by arresting the circulation through the pedicle gradually caused the tumour to fall off by sloughing or mortification. This process would take from two to ten days or more to be completed. During this time, the tumour sloughing, would give rise to offensive discharges; inflammation has extended from the pedicle to the substance of the uterus, peritonitis and death ensuing. The metritis and perimetritis might be induced from simple extension from the injury caused to the neck of the tumour. More frequently these affections were the result of pyæmia or septicæmia.

In many instances death has followed the attempt to remove the tumour by Gooch's instrument. R. Lee records nine deaths out of fifty-nine operations. McClintock records three deaths out of ten operations, the causes being "phlebitis," or metritis and peritonitis.

There is serious danger from retaining for hours or days consecutively a rigid instrument projecting beyond the vulva. Thus, in St. George's Museum, is a specimen (No. xiv. 54) showing that the instrument may cause death by impalement. It is a uterus with a fibrous polypus attached around which a ligature has been applied, and which is seen *in sitû*. The patient having turned in bed on her back, the canula pressing on the mattrass, perforated the uterus and caused death. In the following cases death ensued in other ways: St. George's Museum (No. xiv. 50). Close to the os uteri is a fibrous polypus, to the pedicle of which a ligature was applied. The patient died of peritonitis six days after operation. The two following specimens are in the same museum: No. xiv. 55. A large polypoid tumour *removed by ligature.* Death ensued from peritonitis a week after operation. No. xiv. 58. Uterus with a polypus growing from its wall, which has been partly separated by the ligature. The patient died of peritonitis three days after operation.

St. Bartholomew's Museum shows the following instructive cases: Ser. xxxii. 49. A uterus with many fibrous tumours: one suspended by narrow pedicle from anterior wall just within the internal cervix (os ?) pendulous beyond the os uteri, softened and changed in consequence of its pedicle having been tied shortly before death. Patient, æt. forty, had suffered menorrhagia for two or three years. Pedicle tied by a double canula; next day dysuria, then retention of urine, then signs of peritonitis; death on third day. No. 32.3. Section of a uterus and firm fibrous polypus, which has grown from nearly the whole circumference of the neck of the uterus. A ligature was placed around the polypus near the line of its connexion with the uterus; but the death of the woman took place before the ligature had separated. A portion of glass occupies the groove in which the ligature was tied; and it will be observed that this groove, in a part of its extent, is formed in the substance of the uterus, the neck of which is elongated and almost imbedded in the upper part of the polypus. No. 32.24. "A uterus from which a fibrous polypus was removed by ligature eight days before death. A circular ulcer about one half inch in diameter in the fundus of uterus marks the spot where polypus had sloughed. The whole tissue of uterus is swollen. From a middle-aged woman—she died with acute inflammation of the uterine veins." Fig. 163 is another illustration.

The danger of strangulation by ligature is indeed somewhat lessened by cutting off the tumour below the seat of strangulation. By this means we diminish the source of decomposition, and hence the risk of septicæmia. But the strangled stump may still be enough to set up mischief; and the only argument remaining for not removing the whole tumour at once without the intervention of the ligature is the fear of hæmorrhage. Experience has dispelled even this fear.

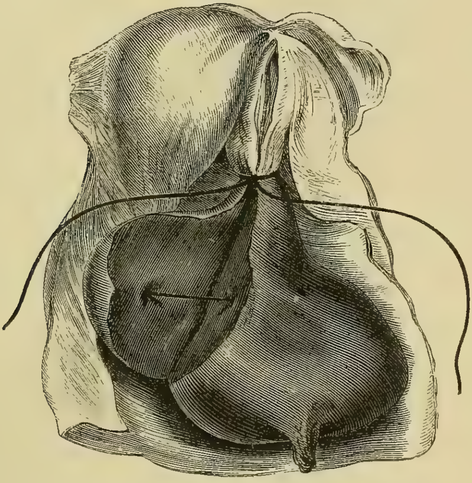

Fig. 163.—(Half-size, St. Bartholomew's, 32, 3a.)

UTERUS WITH FIRM FIBROUS POLYPUS ATTACHED TO THE UPPER WALL (R. B.).

Strangled by ligature. Death from peritonitis.

Phlegmasia dolens has followed slow strangulation.

In addition to the examples I have cited, the literature of the subject down to twenty years ago may be said to abound with evidence of the dangers and mortality attending slow strangulation.

2. *Torsion and excision by scissors* are especially applicable to small polypi of the cervix. To carry out these proceedings it is generally necessary to use the speculum. My speculum, Cusco's

or Marion Sims', are the most convenient. Torsion should on no account be used if the stalk is at all thick or firm. Montgomery, says McClintock, published a case where a portion of the uterus was actually detached, and brought away adhering to the pedicle; the woman nearly lost her life from hæmorrhage. Some soft mucous or glandular polypi are cured by *crushing* with the forceps. Seized between the blades of the instrument, it is enough to break them up. Thus killed, the hæmorrhage commonly ceases. But the spot may be touched with perchloride of iron or by the actual cautery as a further security.

The removal of polypi even of considerable size by scissors was extensively practised by Dupuytren, Siebold, Mayer, and others, who preferred it to the ligature. I have seen it practised by Lisfranc. Sir Charles Locock generally preferred it.

Although it may be generally true that no serious hæmorrhage follows excision, still the risk is not to be disregarded. Montgomery relates a fatal case. McClintock relates a case of polypus growing from the inside of the anterior lip of the os uteri by a pedicle as thick as one's third finger. There was no perceptible pulsation in the pedicle. He divided this with scissors close to the tumour. Smart hæmorrhage succeeded, and the saturated solution of perchloride of iron in glycerine was applied. This checked the general oozing, but two arteries continued to bleed, and having failed after repeated attempts to take them up, he included the pedicle in a strong silk ligature, whereby the hæmorrhage was completely arrested.

The actual cautery would in such cases be applicable.

Sir James Simpson used a polyptome, which consists of a knife strongly curved like a reaping-hook, or the obstetric decapitating hook of Ramsbotham, surmounting a long stem.

But the most accurate and effective instrument is the *wire-écraseur* now generally preferred. It combines the advantages of excision with those of the ligature. It cuts through the pedicle at once. The original of these instruments is Professor Graefe's apparatus, specimens of which are found in the armamentaria of most of the London hospitals. Simpson describes (*Edin. Med. Journ.*, 1850) an instrument given him by Dr. Sabine, of New York, by which a silver wire was made to cut through the pedicle by a screw. Chassaignac's chain-écraseur has been used, but it is not so convenient as the wire instruments. The rope has been made of strands of several fine iron or copper wires; but of late it has been found that a stout, single iron wire, made flexible, answers better. For the best form of the wire écraseur, see Fig. 48, p. 160. A loop is drawn through the eye of the stem, and by the aid of the stem and two or three fingers in the vagina, the pedicle is caught. The noose is then tightened by a travelling screw or windlass, until it comes back through the eye, when the pedicle is found to be divided. The tumour is felt rolling loose in the vagina, and may be seized and drawn out by a vulsellum. If the tumour be very large, the extraction from the vagina may be a work of some difficulty. It has been found necessary to grasp it with the midwifery forceps, and deliver it like a child's head. In noosing the pedicle it is not necessary to carry the noose beyond the tumour, or up to the insertion of the root in the uterine wall. It is enough to get the noose fairly beyond the equator of the tumour, when on drawing in the slack of the wire before tightening by the screw or windlass, the noose will adjust itself at the junction of the tumour with its root. The stump decays, breaks up, and there is no probability of another tumour springing from it. Generally, when a polypus is removed, the cure is permanent. But of course a second uterine fibroid may be converted into a polypus like the first. Should bleeding occur, it may be staunched by perchloride of iron carried on lint, and maintained by plugging. Or the stump may be touched by the actual cautery. No dressing or other application is required. But it may be useful to wash out the vagina with carbolic acid water for a few days.

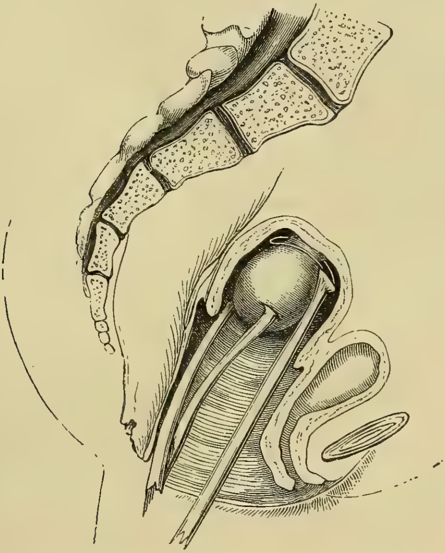

FIG. 161.

OPERATION FOR REMOVING POLYPUS UTERI BY WIRE-ÉCRASEUR (R. B.).

The polypus is seized and pulled down by vulsellum, and the wire is carried over it.

Intra-uterine polypi may be noosed and excised in like manner. If necessary, the cervix uteri can be expanded beforehand by laminaria-tents or by incision.

It is not commonly necessary to induce anæsthesia for this operation. If the tumour be easily accessible, the wire-noose can be slipped over it without causing much pain; and the tumour itself being insensitive, the actual excision is painless. And in discussing the treatment of inversion, we have seen that pain during the tightening of the wire gives warning that the tumour is not a polypus, thus giving opportunity to retrieve error. But when the tumour is large, and the stalk difficult of access, it will often be best to induce anæsthesia; this enables the operator to pass his hand if necessary well into the pelvis, and to explore thoroughly the relations of the tumour before adjusting the wire. A full diagnosis being made, the écraseur, armed with its wire-loop of a size corresponding to the idea we have formed of the size of the tumour, is passed in either in front or behind. The end of the instrument is carried fairly up to the base of the polypus, whilst the loop is slipped over the polypus itself by help of a finger, or a firm notched probe. When the loop is once over the equator of the polypus, a few turns of the screw suffice to carry it down to the stalk. It then adjusts itself, and the continued working of the screw completes the abscission. In some cases it is convenient first to seize the tumour by a vulsellum, and to draw it down low in the pelvis before adjusting the wire, as illustrated in Fig. 164.

When the base of the polypus is very thick, and, especially if we suspect that it is unusually vascular, the galvanic wire-cautery is the best instrument to use. Indeed, this should generally be preferred when the tumour is "implanted" or "sessile."

Even after an intra-uterine polypus has been severed from its attachment by the wire, it is not always easy to get it away. It rolls about under touch or attempt to seize it, like one Chinese ball inside another. If on grasping it by a vulsellum it will not come through the cervix uteri, it may become necessary to cut it up, and to bring it away piecemeal. This may be done by scissors, or it may be necessary to dilate the cervix by laminaria-tents, or incision, or by my bags.

The advantages of instant removal of polypi over slow strangulation are very decided. The relief is speedy; no instrument is left in the parts; and the risk of inflammation and septicæmia is infinitely less. Nor are these advantages weakened by any serious drawbacks. The risk of hæmorrhage is very small. If any bleeding occur it may be checked by touching the surface with a solution of perchloride of iron, or by plugging. I have only once seen serious septicæmia follow ablation by the wire-écraseur. The patient recovered. It may fairly be said that accidents, such as those of which examples are given above from strangulation, are of extreme rarity after instant excision.

It is proper to enforce absolute rest in the horizontal posture for some days after the operation as a security against hæmorrhage and inflammation. But in one case in which I removed a large polypus by the wire, the subject travelled home more than a hundred miles by rail the same day under the charge of her medical attendant without any untoward accident. This was done of course under peculiar and urgent circumstances.

The treatment of the "hypertrophic polypi," to be entirely successful, must be based upon the view traced of their pathology. They must be removed, as a matter of course, but their removal is not enough. The simplest way of removing them is to cut them off with scissors. Should any bleeding follow, this may be arrested by applying a small pledget of lint soaked in perchloride of iron, and then plugging the vagina with lint soaked in carbolic acid oil. The risk of after-bleeding then is very small, provided the precaution be taken to keep the patient in bed for two or three days after the operation. I may here state incidentally, that there is no operation on the cervix or vagina so slight, if involving incision of the mucous membrane, that may not be followed by great, even dangerous, flooding if this precaution be not rigorously enforced. Hence it should be recognized as a rule in practice, never to perform such operations in the consulting-room or in the out-patients' room of a hospital.

The next indication after removal of the polypus is to counteract the process of hypertrophic extension of the cervix uteri, of which the polypus is a consequence. The treatment in the advanced stages, when the elongation is considerable, is a subject not now under discussion. I can only here consider what is to be done in the earlier or incipient stages of hypertrophy when decided action may effectually arrest the morbid process. For a week or so after the removal of the polypus rest is all that is necessary; then if any active inflammation of the cervix remain, the occasional application of solid nitrate of silver or sulphate of zinc, with lead lotions, should be used until the inflammation has subsided. This accomplished, a free slough of the most hypertrophied lip should be wrought by applying potassa cum calce, or the actual cautery in a line across the lip. The healing of this slough induces altered nutrition of the part, promotes absorption, and the contraction following being inwards or centripetal, acts in direct antagonism to the morbid hypertrophic extension. Injections are useful to deodorize the discharges. The best are of lead, perchloride of iron, carbolic acid, kreasote, or permanganate of potash.

Gooch very properly insists that we should not be deterred from dealing with polypoid tumours under the doubt that they may be malignant. If cancerous growths assume the common mushroom-form admitting of being embraced by a ligature, even in part, he has found it good practice to remove them. The hæmorrhages are checked, and, at least, a respite is gained. The accuracy of this view has been lately confirmed by many practitioners. These are especially cases for the use of the galvanic wire-cautery.

The *after-treatment* consists in rest, generous diet, tonics. If there is bleeding, a pledget of lint steeped in perchloride of iron can be applied to the seat of the stump through a speculum. The ulcerations caused on the mucous membrane of the cervix and vagina by the chafing of the tumours will often heal now the cause is removed. If not, occasional touching with nitrate of silver or iodine will be required.

The sessile glandular polypi are easily removed by a fine wire-écraseur. Prominent Nabothian glands or follicles are cured by simply puncturing them. The vascular polypi, if broadly sessile, are most effectually treated by the actual cautery.

Placental polypi I have several times removed satisfactorily by the wire-écraseur. The loop applied close at the base shaves them off completely, or at any rate will so break up their tissue, that hæmorrhage ceases, and the *débris* are quickly removed by disintegration. Sims' curette also will often prove useful in these cases.

CHAPTER XXVI.

TUBERCLE OF THE UTERUS.

TUBERCULAR disease of the uterus may most fitly be considered before cancer. The uterus does not seem to be peculiarly prone to this disease, and when it is so affected, other organs or structures are almost invariably affected at the same time. The development of tubercle in the uterus has been especially observed to date from labour. This circumstance suggests the hypothesis that the active physiological process of gestation and labour augments the predisposition of the uterus to become the seat of tubercular mischief, and thus determines or directs any constitutional tendency that may exist to this organ. There are other facts which support this hypothesis. Thus I have often observed that the calcareous degeneration of the placenta, a condition which chiefly affects the decidua—a true uterine structure—is most liable to occur in strumous or tubercular subjects. When tuberculosis appears after child-birth, it is developed on the placental site.

This sequence of tubercular disease of the uterus upon labour is illustrated in a preparation in Guy's Museum (2261^{74}), taken from a woman aged twenty-four. She had general peritonitis of a chronic character for several weeks, commencing after labour, from which it was thought to have proceeded. It was found, however, to be tubercular. The interior of the uterus was filled with tuberculous matter; the cervix being unaffected.

The disease has, however, been observed in girls who have never been pregnant. The researches I have made dispose me to conclude that tuberculization of the uterus is very rare before puberty.

Mr. Hutchinson exhibited to the Pathological Society (*Path. Trans.* vol. viii.) the uterus of a girl aged fifteen. It was distended into a cavity which contained two drachms of fluid resembling ill-formed pus, only more glairy and adhesive. There was no evidence of ulceration of the mucous membrane, nor any deposit in the parenchyma of the uterus. "I was inclined," says Hutchinson, "to regard it as illustrating the exudation of tuberculous material on the free surface of the lining membrane, by which chronic inflammation, ending in the effusion of an admixture of pus, had been caused." There was tubercle in liver, kidneys, lungs; and she died of albuminuria. Boivin and Dugès figure (pl. xvi.) a specimen of tubercle in the right tube and right broad ligament, taken from a girl aged sixteen.

Tubercle appears on the mucous membrane, and especially on the posterior wall, in the form of grey granulations, which gradually crowd together, and extend into the Fallopian tubes, and sometimes into the cervix. Sooner or later softening sets in. The mucous membrane, beset with tubercles, is changed to a yellow-cheesy pulpy layer, underneath which the tuberculization attacks the uterine parenchyma, so that at last the uterine wall exhibits a similar change for a considerable depth. This cheesy mass suppurates, and is thrown off in lumps of variable size. The discharge is sometimes obstructed by closure of the os uteri, when it collects, distends the uterus, and forms hydrometra. The tuberculization and suppuration commonly are bounded by the os uteri internum. They rarely overstep this spot. Rarely also is tuberculization primary in the cervix. When it occurs there, the suppurative process makes deep excavations in it.

Destruction of tissue may follow upon ulceration; and even perforation may take place through the uterine wall or the Fallopian tubes, leading to effusion into the peritoneal cavity. The tissues of the uterus may be so disorganized, that rupture may ensue if pregnancy exist, as in a case related by H. Cooper (*Medical Gazette*, 1860); and even in the case of the non-pregnant uterus, as in an example related by Guzzo (*Archives Gén. de Méd.* 1848).

Tubercular degeneration of the uterus is almost always attended by a similar condition in other organs. But in not a few cases the disease seems concentrated in the uterine mucous membrane, so that the name "*phthisis uteri*" might fairly be given to it. When this is the case, ragged irregular ulcerations form on its mucous surface; constant purulent discharges, at times streaked with blood, occur. Some enlargement of the organ is common. Severe pain is a frequent symptom. The disease, as may be supposed, is very intractable.

Sometimes the whole genital mucous tract is affected. The Fallopian tubes are commonly implicated. Indeed, Rokitansky and others affirm that it begins in the tubes. When the tubes are affected they become enlarged, distended, tortuous, forming elongated tortuous, sausage-like tumours on either side of the uterus, resembling in shape the tubes affected with dropsy, but differing in being more solid. This condition of the tubes is well seen in Fig. 166, from Carswell; but often the enlargement is considerably greater.

The mucous membrane is not, however, always the seat of election. Thus Dr. Willoughby relates (*Pathological Transactions,* 1869) the case of a woman aged thirty-five, the mother of several children, who had pulmonary tubercle, and died of tubercular pleurisy and peritonitis. She had not menstruated for years. The pelvic peritoneum was beset with cheesy masses, one of which, the size of a walnut, was beneath the peritoneum. This mass had produced rectangular anteflexion of the uterine cavity. The Fallopian tubes were immensely distended with the same cheesy-looking substance, and curiously convoluted; the fimbriated extremities were entirely obliterated by coalescence with the ovaries. These organs were as large as walnuts, filled with the same cheesy material, and one contained a blood effusion or hæmatocele. There was no tubercular deposit in the lining membrane of the uterine cavity.

The urinary mucous tract is sometimes affected. All the pelvic organs may be matted together by plastic effusions. Peritonitis, indeed, is a not unfrequent consequence.

In St. George's Museum (No. xiv. 78) is a good specimen of scrofulous disease of the uterus, tubes, and both ovaries. The body of the uterus contained a quantity of *white soft tubercular matter,* which, at the fundus, was firmer and more consistent, and with a definite outline, penetrating, as it were, into the muscular substance of the uterus. The Fallopian tube on the right did not contain similar matter. Both tubes were impervious at their uterine extremities. The mucous membrane of the cervix and vagina was free from tubercular ulceration, but greatly inflamed, having *miliary deposits underneath it.* Both ovaries were converted into cavities, and contained remnants of a thick semi-fluid tubercular matter. They were greatly enlarged, and their walls much thickened. There were also one or two fibrous tumours. There existed also extensive peritonitis and ulceration of the glands, of both small and large intestines, which in the rectum had proceeded to perforation, and extensive tuberculization of the lungs and pleurisy, also scrofulous ulceration of the right sterno-clavicular joint. The simultaneous affection of ovaries, tubes, and uterus, and general scrofulous disease, is also exemplified in another specimen in St. George's Museum (No. xiv. 79), described in the catalogue as "Scrofulous disease of the uterus, Fallopian tubes and left ovary. The mucous membrane of the uterus is extensively ulcerated, and covered over by a white scrofulous deposit. The tubes are filled with scrofulous deposit, and are much distended and tortuous. The end of the right tube is dilated into a large sac, which was filled with a white flocculent creamy fluid. The left ovary was converted into an abscess, containing scrofulous pus. From S. H., aged eighteen, who died of psoas abscess and scrofulous disease of the medulla oblongata."

The specimen from which Fig. 165, Guy's Museum, 2261^{75} is taken came from a woman aged twenty-six, who died of general tuberculosis; the thoracic and abdominal viscera being extensively involved in the disease. This specimen is remarkable as furnishing evidence of the difference in character of the mucous membrane of the body of the uterus and of that of the cervix. Strictly tubercular disease is limited in this case and in many others to the body of the uterus. In this respect, tubercular disease stands in contrast with cancer, which shows such a decided preference for the cervix.

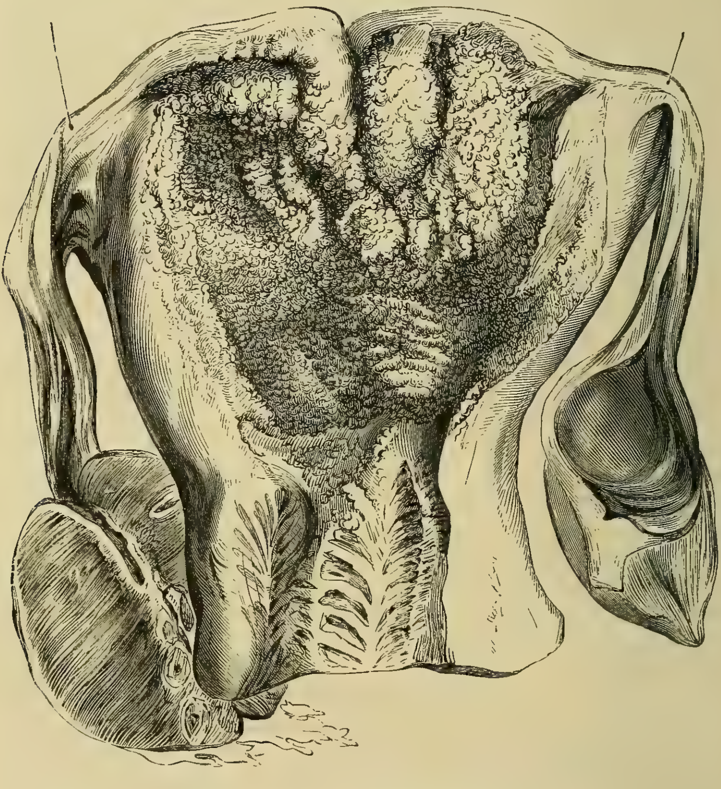

FIG. 165.—(Nat. size, Guy's Museum, 22 1^{75}.)

TUBERCULAR DISEASE OF UTERUS (R. B.).

The uterus full of soft cheesy matter; its internal surface irregular and granular, and devoid of mucous membrane; the cervix unaffected. The Fallopian tubes were filled with, and surrounded by, masses of tubercular deposit.

The ulcerative disposition of uterine phthisis is also well seen in the following illustration from Carswell (Fig. 166).

"This figure affords a striking illustration of the formation of tuberculous matter in the cavity of the uterus and tubes, as well as ulceration of the follicles and mucous membrane of the vagina. *a*, cavity of the uterus laid open, and nearly filled with masses of cheesy-looking tuberculous matter. The walls of the uterus, thicker and more vascular than in the healthy state, contain two or three small masses, *b*, of the same substance. Both tubes, *c*, are dilated; the left completely filled with soft tuberculous matter, and laid open towards its inferior extremity that this substance may be seen. The right tube was filled with a turbid, milky-looking fluid. The internal surface of the vagina, *d*, presents a great number of ulcers, similar to those so frequently met with in the trachea of patients who die in the last stage of phthisis. The ulcers were apparently formed in the follicular structure of the vagina; some of the follicles enlarged, and presenting a central opening, are distinctly seen in the figure. The form of the ulcers is round, oval, or irregular, none of them larger than a split pea; their

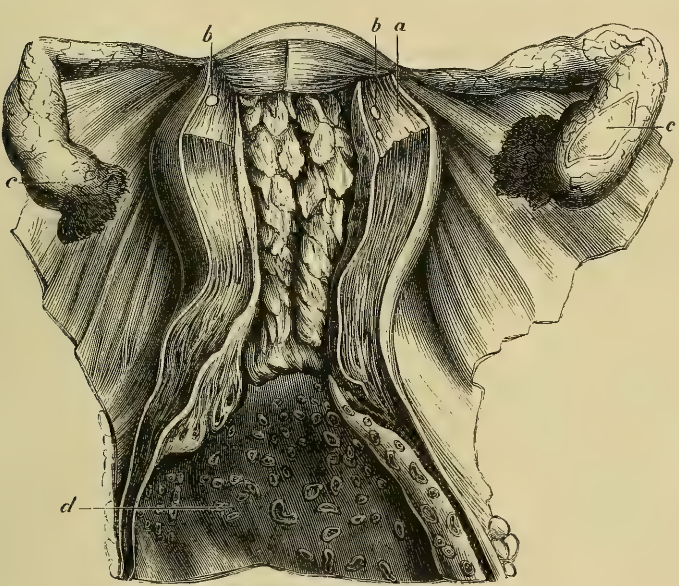

Fig. 166.—(Half-size, Carswell.)

PHTHISIS UTERI.

Tubercular masses in the mucous membrane of the body of the uterus. Ulcers in the vagina. The Fallopian tubes enlarged by tubercular infiltration.

edges sharp and pale; and their bottoms either pale or slightly vascular."

The vagina is so rarely affected that Virchow is quoted by Courty as being the only observer who has verified in this part the development of numerous tubercles.

The *prognosis* is in all cases grave. The disease in the uterus being generally secondary, or at least coincident, with disease in other organs, it can rarely admit of cure. The tendency is towards extension to the tubes, ovaries, and surrounding structures. Fatal peritonitis may at any time arise. Courty relates an interesting case of this termination; and other examples are given in this chapter.

The *diagnosis* must rest greatly upon the evidence obtained of tuberculosis in other parts of the body, especially in the lungs. It is thus of a presumptive character. Since the disease attacks the body of the uterus, leaving the cervix quite or comparatively free, it is most liable to be mistaken for malignant disease of the body, chronic metritis, or some forms of fibroid tumour. There is generally enlargement of the body of the uterus of a uniform character, thus differing from the irregular nodulation of fibroids, and resembling the enlargement of cancer. The cases may also resemble each other in the uterus being fixed by perimetric deposit. In both cases there may be hæmorrhages and muco-purulent discharges; and also pain. But, as in other forms of tuberculosis, there is generally amenorrhœa. Metrorrhagia is exceptional. The distinction would be absolutely determined by bringing away a small portion of the outgrowth or deposit from the cavity of the uterus. Under microscopical examination, the characters of malignant growth would come out in contrast with those of tuberculous matter. In either case, therapeutical considerations would probably indicate the dilatation of the cervical canal. This would facilitate digital exploration, by which the more prominent tumour-like or polypoid character of malignant growths would be detected.

The *treatment* must be looked upon as mainly palliative. The general treatment must be governed greatly by the nature and extent of the distant complications. It is of the same kind as that for tuberculosis of the lungs. The local treatment will be indicated by the local symptoms. If there be hæmorrhage or profuse muco-puriform or cheesy discharge, with or without pain, it will be proper to dilate the cervix with laminaria or sponge-tents; and to swab the interior of the uterus with nitric acid, tincture of iodine, or acetic acid; or iodine-ointment may be inserted every three or four days. Disinfecting vaginal injections of lead, zinc, or carbolic acid will be useful adjuvants.

CHAPTER XXVII.

CANCER: DEFINITION; DEGREES OF MALIGNANCY; ITS LOCAL ORIGIN; HEREDITARY TRANSMISSION; ITS FREQUENCY. IS IT CONTAGIOUS? CAUSES; FORMS OF: MEDULLARY; EPITHELIOMA; SARCOMA; SCIRRHOUS; MYXOMA; CORRODING ULCER. DURATION OF CANCER. CANCER AND PREGNANCY. THE COURSE AND TERMINATIONS OF CANCER; DIAGNOSIS; PROGNOSIS. TREATMENT: QUESTION OF CURABILITY; TOTAL EXTIRPATION OF UTERUS; AMPUTATION OF VAGINAL-PORTION, SELECTION OF CASES FOR; THE OPERATION; CAUTERY, ACTUAL AND POTENTIAL. TREATMENT OF CANCER OF BODY OF THE UTERUS. PALLIATIVE TREATMENT; LOCAL AND CONSTITUTIONAL.

The clinical definition of cancer would be a disease tending to destroy the organ which it has attacked, to invade the surrounding structures, to infect the system, and to cause death. These are the chief characters of "malignant disease." This definition will embrace several forms of disease which differ in their histological characters, and sometimes in their seat and progress. But howsoever differing in other respects, the common feature of malignancy, that is, a tendency to destroy tissue, to spread and to kill, binds them all together into one terrible group.

The main clinical interest attaching to the differential study of these various forms of malignant disease lies in the fact that they exhibit different degrees of malignancy, and that the seat of development materially influences treatment and the prospect of giving relief. Intimately connected with this point is the question, how to detect the disease in its earliest stages? The tendency of modern pathologists has been to regard all cancer as local in its origin. A most hope-inspiring doctrine; one to which the clinical physician should cling as that which most encourages therapeutical research, and which alone holds out a prospect of ultimate triumph over the disease.

No one who is at the same time conscientious and capable of estimating correctly the nature of cancer will be rash enough to hold out a confident promise of cure in any case. But surely modern research and experience, which have already thrown a ray of light into what had long been regarded as an impenetrable and perpetual gloom, may well justify the hope of achieving further success.

Willing, more than willing, to accept the doctrine that malignant disease is local in its origin, two circumstances appear to me to tell strongly against it. The first is the almost constant tendency to a fatal termination from the moment when we have made an undoubted diagnosis. This means that it is rarely indeed possible to find the disease in its presumed strictly local initiative condition. From its earliest discovery it has already effected a strong hold upon the constitution. The other circumstance is the hereditary force of the disease. There is a general consent amongst surgeons upon this point. It constitutes one of its greatest terrors. And yet it is, I venture to think, somewhat exaggerated. Lebert, for one, disputes the hereditary force. In a summary of 948 cases collected from various sources hereditary influence was traced in 78 only. Looking back to my own experience I can recall many instances of isolated cases of cancer in a family to set against other cases of recurrence. Especially in one very large family, whose history I have known for three generations, there has been one solitary instance of cancer.

But there is another fact which bears upon the question of hereditary and of constitutional diathesis. Some diatheses seem interchangeable or co-existent; or we might, to invoke another hypothesis, say that all morbid diatheses are one in their ultimate analysis, and that the development of phthisis in one person, of brain disease in another, and of cancer in a third, is determined by various secondary conditions. This hypothesis is not contradicted by the apparent incompatibility of two diatheses in marked development in the same individual. This incompatibility is only apparent. A person struck with cancer, for example, will be destroyed by this disease before phthisis can be developed, and *vice versâ*. And the co-existence of the affections is not rare. The diathesis which produces one form of local disease, say in the ovary, would often be manifested by the development of other forms, as of fibroids in the uterus. Of the truth of this remark we may see abundant proofs. And if we extend our observation beyond the individual, looking to the family, we cannot fail to see frequent examples of various manifestations of the original taint, showing itself as phthisis in one member, cancer in another, and nervous disease in a third.

Next to cancer of the breast, says Samuel Cooper, cancer of the womb is the form in which the disease most frequently presents itself. Sometimes the disease takes place in the womb and breast together; and Cruveilhier records an instance in which cancer uteri was accompanied by a medullary tumour in the substance of the left hemisphere of the brain, so that, in the latter stages of the case, the patient was attacked with convulsions and hemiplegia. According to this pathologist, however, notwithstanding the tendency of cancerous diseases in general to affect the whole economy, by extending from the point first attacked, as from a centre, cancer of the womb is but rarely accompanied by this general implication of the system, and especially of the breast.

It appears also, from Cruveilhier's researches, that the vagina is as frequently the seat of cancer as the neck of the womb. "Its anterior paries is much more frequently attacked than its posterior; and hence it is rare to find instances in which the lower portion of the bladder does not participate in the disease." (*Anat. Pathol.* liv. xxiii. pl. 6.) But in some cases, no doubt, the disease begins in the bladder, extending to the uterus as in a specimen (Ea. 7) in the London Hospital.

Cancer of the uterus may originate at any period after puberty; but the time of life between the ages of forty and fifty is that in which its commencement is most common. A specimen of cancer affecting the uterus and vagina in an infant nine months old was exhibited to the Obstetrical Society by Mr. Heckford, surgeon to the East London Children's Hospital (*Obstetrical Transactions*, 1868). I removed a rapidly pullulating epithelioma emerging from the vulva of a child. It returned and proved fatal. Cruveilhier observes, that from the age of thirty-five to that of fifty is the principal season for this cruel disease, though he has known one woman of the town die of it, whose age was only twenty-six; and he had seen it in women as old as sixty, seventy, and eighty, and even eighty-three. In St. George's Museum is a specimen showing the disease at the age of ten (No. xiv. 82). The walls of the uterus are greatly distended, and its cavity filled by a large encephaloid growth which, originating in the muscular structure, on the left side, appears to have made its way into the cavity as well as outwards. A red discharge had taken place from the uterus, which led her parents to believe she was menstruating. Mesentery, liver, and pancreas were extensively diseased with cancer.

The cases cited of the disease occurring in children are sufficient to prove that it may occur in single women, and in those who have never been pregnant. But although I have met with it in single and sterile women of all ages, I entertain a strong opinion that it is far more common in those who have borne children. Ovarian disease more peculiarly affects the single and the sterile. Numerical statements of Scanzoni and Sibley go to establish this view. The pathological inference would be that functional activity is a predisposing cause, or that the changes started in the structure and nutrition of the uterus by labour favour the selection of this organ for the manifestation of a general diathesis. This seems, as we have seen, to be clearly so in the case of tuberculosis.

The question is sometimes anxiously asked *whether cancer of the uterus is contagious?* If it be propagated by cell-growths, which may be regarded as germs, it seems a not unreasonable conjecture that the malignant cells may be transplanted or grafted upon the tissues of another person, and grow in this new nidus just as they do by extension in the original subject. I do not know, however, of any unequivocal facts to favour this idea. I have known, of course, as every physician of experience must know, of many cases of husbands living with their wives long after the disease had been recognized; but I have not known of a single instance of the disease being propagated. Possibly grafting on a raw surface is necessary; and probably, the malignant cells will only retain their vitality in tissues of congenial morbidity.

Cruveilhier finds, that what he terms the *areolar pultaceous cancer*, is the most frequent of all the forms of cancer to which the uterus is liable. In this the uterus is transformed into a spongy texture, from which a cancerous substance, of greater or less consistence, may be compressed in the shape of small worms; so that, when this texture has been emptied by suitable preparation, a hollow cellular structure remains. Cruveilhier conceives that he has made out the fact, that cancer of the uterus begins in the venous system. However this may be, he notices another fact, which is of greater importance to the practitioner, viz., that the *lymphatic glands* in the *pelvis are almost constantly affected in cancer of the womb.* He specifies in particular two glands, situated, one to the right and the other to the left, at the sides of the pelvis, on a level with the highest part of the ischiatic foramen: these, he says, are often the only lymphatic glands implicated. The lumbar glands he finds less frequently diseased than the pelvic; and he states, that they may be enlarged and red without presenting any vestige of cancerous structure. The inguinal glands are only involved when the disease attacks the external pudenda, and the orifice of the vagina. In only one dissection he found the cancerous substance in the thoracic duct, though he examined it at every opportunity; and, in another instance, he traced the same substance in many of the lymphatics, which proceeded from the diseased parts. (*Op. cit.* liv. xxvii.) I have, however, traced it along the iliac veins into the vena cava. In one case, dissected by Cruveilhier, one ureter was enormously dilated, and the corresponding kidney wasted. "The relations of the ureters with the lateral and superior part of the vagina, and with the lower part of the bladder, which is often implicated in cancer of the uterus, account for the impediment to the flow of the urine through the ureters, the lower portions of which are often surrounded by cancerous masses, which compress them. This compression may take place in so great a degree, that the lower part of the ureter is completely obliterated; and, what is remarkable, such compression does not produce the fatal consequences, which theoretically might be expected. The urine dilates the ureter (see Cruveilhier, liv. xxvii. pl. 2, fig. 2), which, at the same time that it becomes dilated, is lengthened and rendered tortuous or spiral, like a varicose vein. The pelvis and calices in their turn are also expanded, so as to acquire a considerable capacity. The kidney, compressed by the urine, accumulated in the dilated calices, gradually wastes away, and is converted into a mere shell, or husk of a pale yellow, having some resemblance in colour to the changed state of the kidney, known of late by the name of Bright's Disease; and such atrophy may proceed so far that no urine can be secreted, or so little, that any redundance may be easily prevented by absorption." The possibility of life continuing long, with an obstruction of both ureters, would be, however, a very different case from that described by Cruveilhier.

Gangrene, consequent on cancer of the womb, is found by Cruveilhier to be very common, sometimes destroying the cancerous structure, layer by layer, and in other instances attacking the whole mass of it. In both cases, the discharge becomes horribly fœtid, and when the finger is withdrawn from the vagina, it brings away a sloughy putrid detritus, which Cruveilhier says can be compared to nothing more like it than the substance into which hospital gangrene transforms the textures invaded by it. The sloughing may advance slowly or rapidly; a difference which has vast influence on the intensity and acuteness of the symptoms. When gangrene attacks the whole of the cancerous mass, and nearly annihilates it, the case might be mistaken for one of primary mortification; and, in many examples, the cancerous state of the pelvic and lumbar absorbent glands is the only criterion of the gangrene having been preceded by a cancerous affection of the uterus. (*Anat. Pathol.* liv. xxiv.)

All the known forms of cancer may affect the uterus.

1st, Fungoid, encephaloid, or medullary carcinoma is by far the most common; 2nd, in frequency, come the epithelial kinds; 3rdly, sarcoma; and 4thly, the scirrhous or hard cancer. This last, West and Rokitansky say, is extremely rare.

Each of these forms has its own characters of evolution and of structure, and these entail differences in clinical features. *True cancer*, says H. Arnott,* includes those cases in which a structure more or less resembling that of a scirrhous breast is met with, namely, an alveolar fibrous stroma, in the interstices of which float, in a clear fluid and with no visible intercellular material, cells of varying shape, but all approximating somewhat to the squamous epithelial type, and containing usually only one large oval nucleus with bright nucleolus. In many cases the fibrous stroma, instead of forming a dense network, is visible only as a thin streak here and there, and in these cases the varied shapes of the cells, and the absence of the intercellular substance, stamp the cancerous nature of the growth. The cells occasionally contain multiple nuclei. In some places Arnott thought he could trace a development of the cancer-structure from surrounding "adenoid," or lymphatic gland-like material, the cells of the new growth taking the place of the small nuclei in the fibrous stroma of this structure; but more generally the cancer seemed to be splashed in, so to say, amongst healthy uterine tissue. But separate nodules of the new formation are rarely met with imbedded in parts of the uterus at a distance from the ulcerated portion.

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* "Cancer: its Varieties," &c. Henry Arnott, 1872.

1. The *medullary cancer,* or *encephaloid.*—This has its special seat in the connective tissue or stroma. It is found as a thick, hard, nodular mass,. of white, grey, or red colour, consisting of a fibrous framework, with a brain-like pulp in the interstices. As a rule, cancer is characterized by an infiltration of cells of a monstrous type, and great activity of multiplication, into the natural areolar tissue. Wherever areolar tissue is found, there cancer is prone to form. In uterine encephaloid, these cells commence in the cellular tissue between the mucous membrane and the proper tissue of the uterus. As De Morgan pointed out, the cells are non-coherent. Lebert thinks cancer may begin in the follicles of the neck of the uterus. The disease gradually encroaches upon the deeper strata; but commonly there remains after death a thin layer of muscular substance beneath the peritoneal investment of the uterus. The extension is not so much inwards into the uterine tissue, as centrifugal. At first this, like the other forms of cancer of the uterus, appears to be strictly local, confined to the cervix. But after a time, difficult to determine, the disease invades the areolar tissue of the fundus of the vagina, the base of the bladder, the rectum, the broad ligaments, uniting all these parts into one mass. As the cell-growth proceeds, the normal elements of the parts invaded disappear. The diseased mass increases in size, reaching often a considerable bulk, so that the finger, scarcely introduced through the vulva, will in cases somewhat advanced at once strike upon it. The deformed os uteri is brought low down, as in prolapsus. It is often hardly recognizable from the nodular, irregular projections and fissures which surround it. It is sometimes occluded by these, but more often held unnaturally patulous. In this stage, the

cervix uteri being involved in a growth extending to all the surrounding structures, is set fast; it has lost all mobility; or, if any remain, it moves only with the whole diseased mass.

The next feature of importance in the history is the marked tendency to softening and suppuration. Softening is soon followed by death of the mucous membrane of the os uteri; "an ulcer (West) forms, with raised irregular, hardened edges, and a dirty putrilage takes the place of the smooth but enlarged lips of the os. The disease may go still further; the lips of the womb and its cervix are altogether destroyed, and a soft, dirty-white, flocculent substance covers the uneven granular and hardened surface. The ulceration may begin in the substance from softening, or on the surface without previous softening in the deeper parts."

The stage before ulceration varies much in duration. In many cases it is certain that the extension of the disease has greatly advanced before the patient seeks advice. Probably a year or more may elapse before ulceration occurs. The duration of the stage of ulceration is also variable. Sometimes it runs through this stage rapidly; at others, the ulceration, without healing or spreading much, is kept up for months. The patient indeed grows worse, losing flesh and strength, assuming the characteristic worn, straw-coloured, cachectic look. The discharges continue, composed of pus from the ulcerated surface, fœtid from the admixture of dead and decaying materials, tinged with blood from the giving way of some of the vessels distributed to the granulations, while every now and then abundant hæmorrhages break forth. If we examine, we find sprouting granulations or a positive fungous outgrowth from the surface, and then after a time the fungus disappears, the surface feels less uneven, the edges less unhealthy, and we can almost persuade ourselves that here and there a process of cicatrization has begun. New formation and death of the newly-formed tissues go on in rapid succession—a series of abortive attempts at cure, such as prevent the rapid extension of the ulcer, and keep alive the delusive hope of recovery. And, indeed, under the spontaneous or assisted powers of Nature, it is not uncommon for the disease to exhibit stages of apparent arrest, during which the discharges are lessened, the local suffering is abated, and the general health improves. But sooner or later, relapse is but too sure, and the patient at length sinks under the exhaustion consequent upon repeated discharges—watery, purulent, and hæmorrhagic,—pain, obstruction to the rectum and bladder in the performance of their functions, and impairment of nutrition.

Fig. 167 exhibits the action of medullary cancer upon the uterus. The cervix and lower part of the body are principally affected, but the body of the uterus is sensibly enlarged.

Fig. 168 shows that the encephaloid form may invade the body as well as the cervix.

As the disease advances upwards into the cervix, eating away the tissues, a large gaping cavity with irregular edges is formed, sometimes extending by fistulous passages into the bladder and rectum. So strict is the apparent limitation of the disease to the cervix in some cases, that this part is completely eaten away, leaving the body almost intact. (See Figs. 169, 170, pp. 830, 831.) But, although primary cancer of the body of the uterus is rare, the disease will generally spread to it from the cervix if the patient's life be sufficiently protracted. In advanced cases the body of the uterus is almost always enlarged, and this from two causes. The maintenance of an active parasitic growth, like cancer, attracts blood to the organ; it grows under this morbid stimulus as it will under

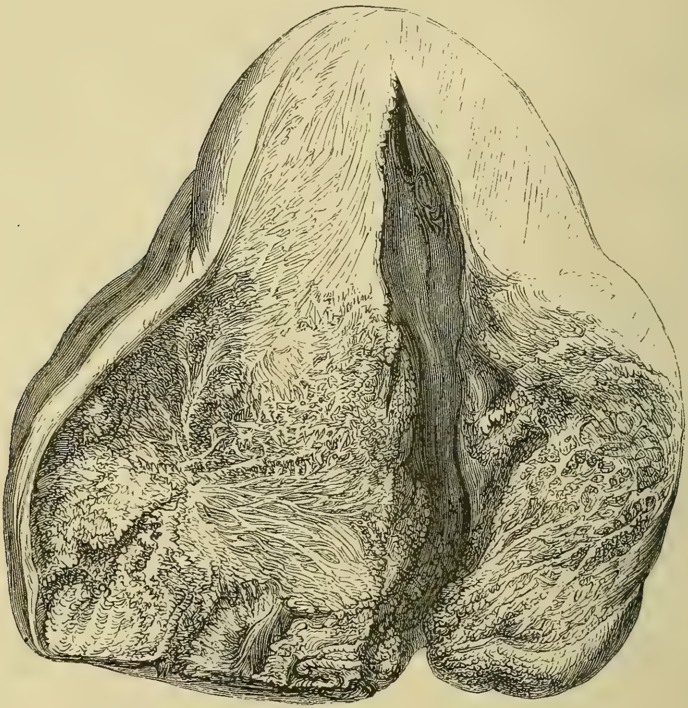

FIG. 167.—(Ad Nat., St. Bartholomew's Museum, 32^{15}.

CANCER OF UTERUS (R. B.).

The lower two-thirds of the walls are enlarged by the infiltration of a soft medullary substance. The natural texture of the organ can hardly be discerned. The disease forms a large spheroidal mass, of which the lower surface, projecting in the vagina, is ulcerated and flocculent.

that of developing a fibroid tumour, or as under the normal stimulus of gestation. In addition there is an extension of the cancerous growth. The mucous membrane of the body is more generally affected. Sometimes nothing more is apparent than a general and intense redness of the interior of the womb; but much more frequently the lining membrane is covered by a dark offensive secretion, and is beset here and there by small white deposits of cancer.

The irritation caused by the morbid condition of the body of the uterus will often set up a slow or chronic inflammation in the broad ligaments and pelvic peritoneum. The fibrinous effusions resulting bind the uterus to the bladder and rectum, adding to the mass formed by the cancerous deposit, and still further determine that firm fixing of the uterus in the pelvic cavity which is observable in almost every instance of carcinoma of the medullary kind, except in the very earliest stage. Cancerous deposits take place under the pelvic peritoneum; extending, the peritoneum is involved, and at length is indistinguishable in the midst of the large mass of cancerous disease which conceals the uterus and its appendages from view. Towards the end hæmorrhages often stop, but the watery purulent discharges increase in quantity; whilst the anæmic cancerous cachexia, pain and sleeplessness, and spasms, with disturbances of the alimentary canal, increase.

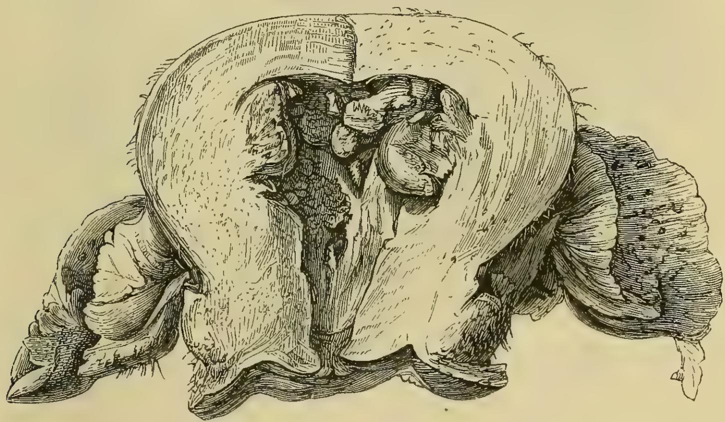

FIG. 168.—(Half-size, St. Thomas's Museum, G G 43.)

UTERUS GREATLY ENLARGED FROM INFILTRATION WITH ENCEPHALOID MATTER (R. B.).

The uterus measures nearly five inches across; its walls are one and a-quarter inches in thickness, except at the upper part, where they are somewhat less. This is due to infiltration with cancerous deposit, which exists in greater abundance in the inner two-thirds of the muscular parietes; this part presents a spongy appearance where the deposit has been partly washed out. The os and cervix uteri participate in the enlargement. Several spongy-looking cauliflower fungoid growths project from the parietes into the cavity of the uterus; their reticulate and spongy appearance is also due to the encephaloid material having been partly washed out.

Figs. 169, 170 show the ravages made by the destructive necrotic ulcerative process when the disease is chiefly limited to the cervix. In Fig. 169 the body of the uterus is evidently affected. In Fig. 170 the body remains almost intact, although the lower part of the uterus is literally eaten away.

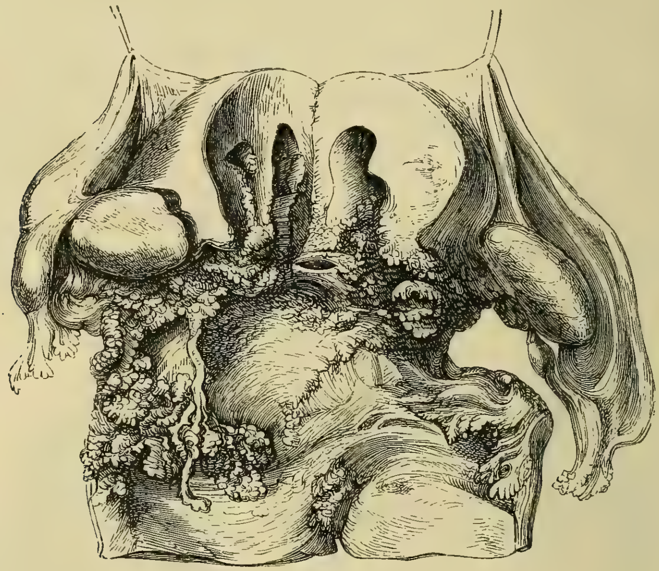

FIG. 169.—(Two-thirds size, St. Bartholomew's Museum.)

Uterus, of which the lower two-thirds have been destroyed by ulceration, of cancerous nature. The adjacent part of the vagina is superficially ulcerated (R. B.).

It is in this way that the vagina, being destroyed at the fundus and upper part of its anterior and posterior walls, the septa between uterus and vagina and the bladder and rectum being destroyed, the three canals are thrown into one common cloaca, which receives all the excreta.

2. *Epithelioma*, according to H. Arnott, is characterized by an accumulation of ordinary or hypertrophied epithelial scales in an unnatural position, sometimes accompanied by nests, or "globes épidermiques," although not necessarily so distinguished, and with usually a very disorderly clustering of the scales, which are otherwise disposed with cohering edges. In some cases a section carried through the mucous membrane of the cervix close to the ulceration showed hyperplasia of the epithelial elements upon and between the papillæ, with infiltration of the same elements amongst the deeper structures; other sections from a more diseased portion of the same uterus,

exhibiting only the confused heaps of epithelial cells, with much broken-down, oily or granular *débris.*

The *cauliflower excrescence* of Dr. John and Sir Charles Clarke is the best known form of the *epithelial cancer* of the uterus. It appears from Gooch's criticism to be the same disease as was described by Levret and Herbiniaux, under the name of "tumeur vivace." It also affects by preference the cervix. Epitheliomata take their habitual origin in the epithelial layer of the upper part of the vagina and os uteri. Here the epithelial buds become developed, and form a tumour, which projects into the vagina. Opinions differ as to its malignancy. Rokitansky believes it to be cancerous, calling it the villous cancer. He describes it as a conferva-like growth, consisting of corpuscles the size of linseed grains, pale red, transparent, tolerably firm, hanging from the os uteri into the vagina, bleeding profusely on the slightest touch, and developed out of an encephaloid. It often fills the vagina, and causes profuse watery secretion. During life it becomes turgescent, like the uterine surface of the placenta; but dead, it shrivels up, and then only resembles a flocculent mass.

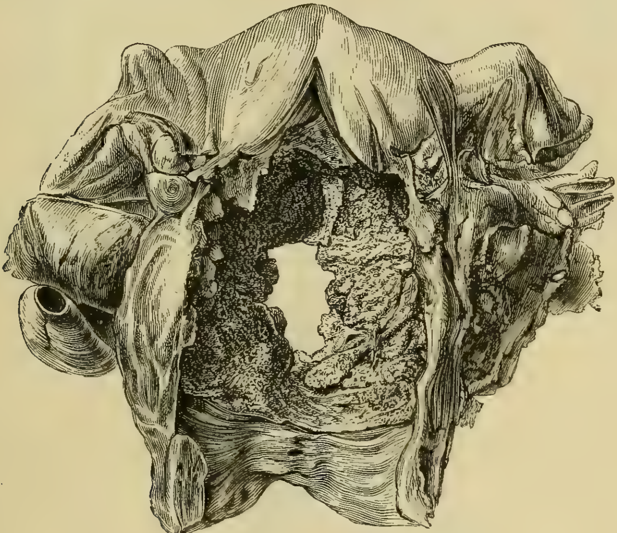

Fig. 170.—(Half-size, St. Thomas's Museum, GG 55.)

CANCER EATING AWAY THE LOWER HALF OF THE UTERUS AND PERFORATING INTO THE BLADDER (R. B.).

Virchow, on the other hand, says it is not cancerous, ranking it under the papillary tumours, of which there are three forms —the simple, the cancroid, and the cancerous. The cauliflower excrescence, according to him, begins as a simple papillary tumour, and runs into cancroid, but not into cancerous papillary tumour. It is formed only of papillary or villous growths, which consist of thick layers of peripheral flat and cylindrical epithelial cells, and a fine inner cylinder of extremely small cellular tissue with large vessels, running in loops. This tumour is also called papillary hypertrophy of the cervix uteri. Mayer regarded it as an originally local affection. Hannover separates it from cancer, under the name of epithelioma. Lebert and Schutz call it epithelial cancroid. Virchow points out that the forms which yield dry, juiceless masses are relatively benignant; whilst those which produce succulent tissues have always more or less a malignant character.

Cancroid remains for a long time local.

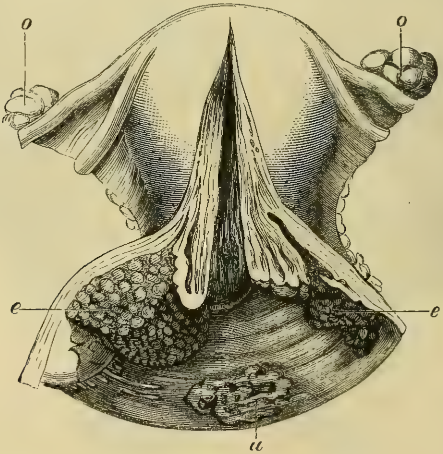

Fig. 171.—(Half-size, early stage. After Lancereaux.)

PAVEMENT-EPITHELIOMA OF UTERUS.

The uterus laid open. *e*, mammillary vegetation filling the vaginal *cul-de-sac*, and almost covering the os uteri; *u*, softening and ulceration of the vaginal mucous membrane.

Fig. 171 shows epithelioma in an early stage. It consisted of epithelial cells and "epidermic globes;" some of the cells had multiple nuclei. The subject was thirty-eight years old, pluripara. After suffering for several months from white and red discharges, pains in the hypogastrium and loins, she was admitted to the Hôtel-Dieu with severe flooding; a second flooding carried her off. The pelvic and lumbar glands were unaffected.

Fig. 172 seems to be an example of epithelioma affecting the body of the uterus.

The divergence of opinions as to the cancerous nature of this growth is difficult to reconcile. But if it be admitted—and clinical observation dictates the admission—that the cauliflower excrescence frequently springs from a base of medullary cancer, or at some stage is associated with cancer, there is strong ground for taking the more unfavourable view. Certainly, in some cases the cauliflower form becomes lost in the ordinary characters of medullary cancer; appearing to be simply a phase in the development of the latter. Moreover, with cauliflower excrescence of the uterus, malignant disease of undoubted form is occasionally found in other parts of the body. At the same

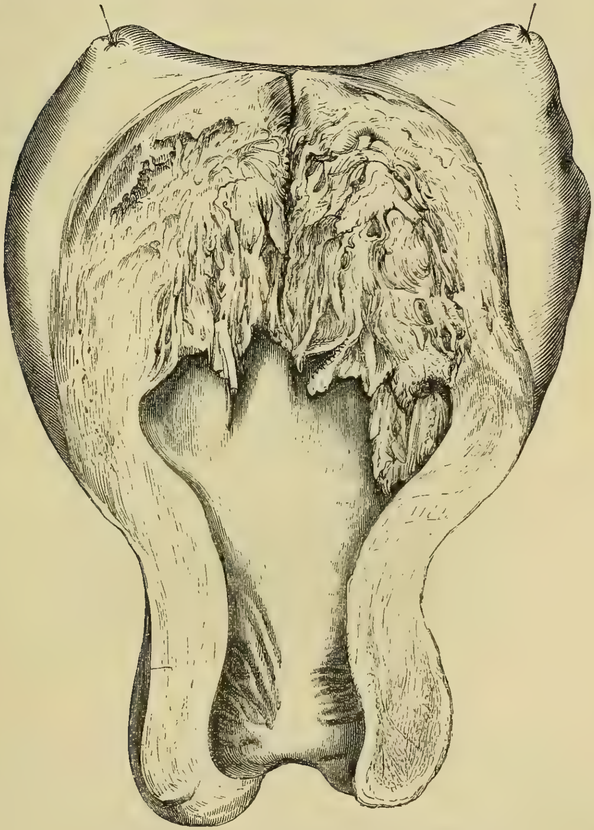

Fig. 172.—(Ad Nat. St. George's Museum, XIV. 84.)

MALIGNANT DISEASE OF THE UTERUS, WHICH HAS BECOME BROKEN DOWN, THE RESULT OF ULCERATION (SOMETIMES CALLED CAULIFLOWER EXCRESCENCE) (R. B.).

The patient laboured under a discharge from the vagina. A fungous excrescence is seen growing from the fundus. She had scirrhus of the breast, and fungus hæmatodes of the liver.

time it is eminently important, in a therapeutical aspect, to bear in mind the apparently lesser degree of malignancy of the cauliflower excrescence, and its greater concentration in, or limitation to, the vaginal-portion of the cervix, up to a certain period of its growth, than is at all common with regard to the medullary cancer. Ablation of the growth by amputation of the vaginal-portion is fairly successful, if performed during the stage of localization.

It is not easy to get an opportunity of examining the disease in its initiative stages. The symptoms produced are rarely such as to lead the patient to seek advice. When first seen, the cervix has been already somewhat increased in size, the os uteri not open, but its lips flattened and expanded, so that their edge, which felt a little ragged, projected a line or two beyond the circumference of the cervix, while their surface was rough and granular. This irregularity was seen to be produced by the aggregation of numerous small somewhat flattened papillæ of a reddish colour, semi-transparent, and often bleeding very easily. Generally, these small papillæ increase in size, and form a distinct out-growth from the whole circumference of the os uteri of the size of an egg, an apple, or even larger. These growths are split up by deep fissures into lobules of various size, all of which seem to be connected together at their base. The dimensions of these growths are not in general the same throughout, but they spring from the surface of the os uteri by a short thick pedicle, which is the elongated and hypertrophied cervix, and then expand below into the peculiar

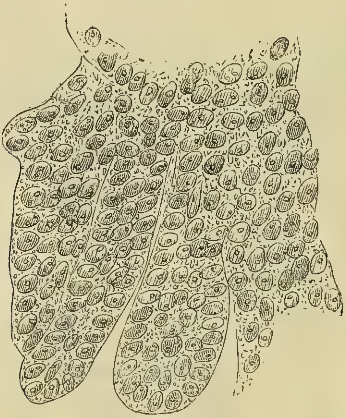

FIG. 173.—(By H. Arnott.)

CAULIFLOWER GROWTH OF THE CERVIX UTERI (SARCOMA).

From a specimen furnished by the author, removed by galvano-caustic operation.

cauliflower shape. At the base the substance is much firmer. Though the vagina does not by any means escape from participation in the disease, and a granular or papillary structure may be felt sometimes extending over its roof, and for some distance along one or other wall, yet this is by no means constant. The tendency to involve adjacent parts is far less than in ordinary cancer. Usually the outgrowth, in the course of time, disappears in part, under the processes of alternate partial death and reproduction which characterize the medullary cancer. The irregular, sharp-cut edge of the os, whence it grew, is at first felt granular and mucous within, but afterwards grows thicker and nodulated, assuming by degrees all the characters of a part which has from the first been the seat of medullary cancer.

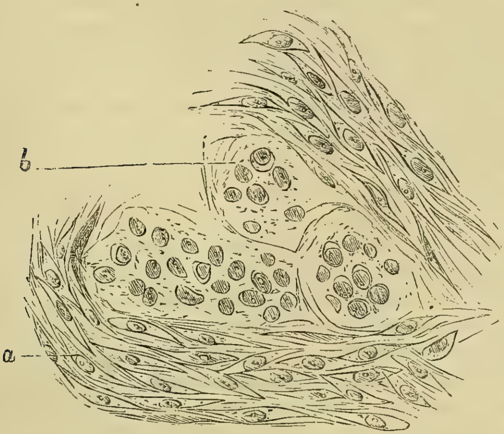

Fig. 174.—(After H. Arnott.)

SPINDLE-CELL SARCOMA.

Thin section, showing in the centre groups of cells divided transversely.

3. *Spindle-cell sarcoma* is a structure made up of densely-packed cells having a spindle shape, being usually arrayed in a tolerably regular manner, and containing generally single, rarely two, comparatively large oval nuclei. In neither of the cases of uterine sarcoma was anything like encapsulation observed, either in the uterus or in the nodules in the lungs or glands. The sarcoma in this respect followed what H. Arnott believes to be the general rule, although sarcomatous tumours are thought by many to be usually invested by a capsule of some kind, instead of freely infiltrating surrounding tissues.

Gusserow (*Archiv für Gynäkol.* 1870) says sarcoma is often confounded with carcinoma and cancroid. He says C. Mayer, Virchow, L. Mayer, Weit and West give cases of hard sarcoma under the name "recurrent fibroids." The recurrence is tardy compared with that of cancer, but some cases have been rapidly fatal. There can be no doubt, he says, that true fibroma may pass into sarcoma by the exaggeration of its cellular elements.

Further observations are necessary to determine how far Gusserow's statement that sarcoma is the special disease of the body of the uterus is correct. Consulting H. Arnott, upon this point, he tells me that in the few cases he has studied, the sarcoma has *not* been limited to the fundus. In one case of this kind, in which os and cervix alone remained unaffected, the disease was distinctly carcinomatous. On the other hand, the only other case he has seen (shown by the late A. Bruce, and reported upon by W. Fox, Hulke, and Cayley, *Path. Trans.* vol. xviii.) which, although called cancer was clearly sarcoma, did show a nodule in the fundus of the uterus, the os remaining free. But this was a secondary not a primary tumour, the primary disease being a mixed enchondroma of the shoulder.

Professor A. R. Simpson (*Edin. Med. Journ.* 1876) relates four cases of this disease with valuable commentaries. A point to which he draws attention is that in several instances the disease was attended by inversion of the uterus. Many cases of the so-called "recurrent fibroid," already referred to in the chapter on "non-malignant tumours of the uterus," might be more correctly classed as sarcoma. Although not so rapidly fatal as epithelioma or medullary cancer, sarcoma will fall within the clinical definition of cancer given at the commencement of this chapter. Kunert says (*Arch. für Gynäkol.* 1874) that "in fourteen out of thirty cases death ensued within a year after the first appearance." A. R. Simpson says it causes less pain than true cancer. But I do not think this character is constant. In the diffuse sarcoma, the more common condition, operative treatment is scarcely admissible. Where it assumes a polypoid form removal by galvano-cautery is distinctly indicated. But we must be prepared to repeat the operation.

4. The *scirrhous* or *fibrous cancer* is so very rare that West and Paget have not met with it. Rokitansky thus describes it, deducing his description, as he admits, from a very few observations: "On a careful examination one may discover, in the midst of the tissue of the portio-vaginalis, another structure recognizable by the different shade of white of the fibres composing it, and which, though closely packed, intersect each other in every imaginable direction; while the small interstices between them are filled by a transparent matter, of a pale yellowish red or greyish colour. This new structure is infiltrated into the uterine substance without any distinct limits, extending further in one part than in another, and here and there heaped up in greater quantity, thus producing the enlarge-

ment of the portio-vaginalis, the uneven nodulated character, and the well-known induration of its substance."

There is a form of *intractable ulceration* of the os and cervix uteri, which most authorities refer to epithelial cancer, but which some regard as of tubercular nature. The tubercular ulcerations are thus described by Robert: "They may be recognized by their excavated base, their greyish appearance, and the presence of caseous matter in the midst of the muco-purulent discharges which come from the interior of the cervix; also by the presence in the cervix of tumours of uncertain size, rounded form, at first firm and with no change of colour, afterwards soft, whitish, yielding to the pressure of the fingers, and giving an indistinct sense of fluctuation. These tumours are formed by the tubercular matter still in a crude state, or in course of softening. These scrofulous ulcerations are almost always accompanied by considerable engorgement of the cervix uteri." On the other hand, under the microscope, the softened matter is found not to consist of the elements of tubercle, but of epithelial cells similar to those of the uterine mucous membrane, while the indurated callous structure which forms the base of the ulcer is composed of a mixture of fibro-plastic and epidermoid materials. Robin says this kind of ulcer is to the uterus what lupus or cancroid ulcers are to the face. Lebert, Hannover, and West support the testimony of Robin.

The *corroding ulcer* of Dr. John Clarke, or *rodent ulcer*.—Opportunities for observing this form of ulcer on the cervix uteri are exceedingly rare. But the observations that have been made justify the conclusion that the disease, when affecting the uterus, is similar to the rodent ulcer of the face or other parts. Its aspect, rate and mode of progress are unlike those of cancer, while neither cancer-cells nor epithelium formations are present in the adjacent tissues. It begins at the mucous membrane covering the os uteri, involving the whole circumference of the os, and utterly destroying both it and the subjacent parts, but there is no thickening, hardness, or deposit of new matter in the vicinity. Unlike cancer, the rodent ulcer may continue for years, without causing any very formidable symptoms.

Lancereaux describes four forms of malignant or quasi-malignant disease of the uterus: epithelioma, carcinoma, sarcoma, and myxoma. The *myxoma* he compares with the hydatidiform degeneration of the chorion. In one case he describes, the body only was affected; the cavity was enlarged, filled with mammillary projections compressed against each other, and implanted in the mucous membrane by a kind of pedicle. They resembled the columnæ carneæ of the heart. Others, smaller and more rounded, were as big as an almond or champignon. They were generally soft, collapsed under pressure of the finger, giving issue to a little thick juice. They were yellowish white, or blackish from small blood-extravasations. These masses, constituted by rounded cells, fusiform and refracting, separated by an amorphous, hyaline substance, enclosed large and numerous vessels, remarkable for the delicacy of their coats. The subject died of pneumonia.

The frequency with which malignant disease invades the cervix of the uterus in preference to the body seems to be over-rated. Cases are really not infrequent in which disease running a malignant course is met with in the body, the cervix remaining quite unaffected. All the forms of malignant disease may begin in the body. I am not in a position to affirm which is the most frequent; but I am inclined to think that the medullary or encephaloid form is the most common. When the body is primarily affected, distress is usually manifested at an earlier stage. Hæmorrhages especially are frequent and profuse. Pain is more intense and persistent. The morbid tissue projects into the enlarged cavity in irregular masses, sometimes of polypoid shape, but seldom being fairly pedunculate. They are usually sessile on broad bases. They bleed profusely on the slightest touch. Probably in the case of epitheliomatous growths there is a stage when the disease is mainly superficial, the substratum in the muscular wall of the uterus being still but slight. Some forms of the "fungosities" or "carnosities," referred to in the chapter on "Endometritis," are, I have no doubt, of epitheliomatous nature. Indeed, H. Arnott has examined for me some specimens I have scraped off from the living uterus. This temporary superficial limitation is extremely important to recognize, since it offers the prospect, if not of cure, at any rate of temporary relief by surgical treatment.

In these cases the body of the uterus is commonly enlarged to about double the natural size, from its walls being thickened. The patient being under chloroform, the finger will generally pass through the cervix, and thus we can explore the cavity of the uterus by direct touch. The cavity is generally shorter than normal; the walls are apart; they form a rigid hollow globe; the finger feels a soft, pulpy mass lining the whole cavity; portions are easily detached by pressure or scraping with the nail. These brought away look to the naked eye like boiled sago in red currant jelly. Some bleeding invariably attends this examination. Portions of the diseased tissue often are discharged spontaneously, and thus reveal the nature of the affection.

Cancer of the body of the uterus is sometimes secondary, having been derived from primary affection of the ovary. Benporath and Liebmann (*Monatsschr. f. Geburtsk.*, 1865) describe a case of fibroids of the uterus which became affected with cancerous infiltration, proceeding from primary cancer of the vagina.

The lymphatic glands of the pelvis, and especially those which surround the uterus, are frequently the seat of cancerous extension. The invasion proceeds step by step, successively catching the glands situated by the lumbar vertebræ, and following the course of the large vessels, which may be compressed or ulcerated. Sometimes the inguinal glands become cancerous. This is especially the case when the disease has attacked the vagina and vulva. I have described two cases in which the glands in remote parts of the body were also affected. It may, however, have happened that, in these cases, the enlargement and induration were due to irritation from the absorption of the fluid element (the cancerous ichor) of cancer, and not to the actual spread of cancer-cells. It is remarkable that in one of these cases, marked general improvement, with diminution of the glandular swellings, followed upon the attainment of a healthier condition of the local disease.

As to the frequency with which the glands are implicated, the most accurate information is supplied by Henry Arnott (*Path. Trans.*, 1870), who examined 57 cases of cancer in the Middlesex Hospital. There were no secondary growths in 34. The lymphatic glands were involved in 20; in 11 the viscera contained secondary growths; of these, 5 in ovaries, 3 in liver, 2 lungs, 1 heart, 1 both breasts, 1 peritoneum.

In 22 the microscopic characters were clearly made out. True cancer 12, epithelioma 8, spindle-cell sarcoma 2. In both cases of spindle-cell sarcoma, the disease appeared elsewhere also, *i.e.*, in pelvic glands. Of the 8 epitheliomata the taint extended in three instances—(1) to ovary and pelvic and lumbar glands; (2) to broad ligament; (3) to lumbar glands. Of the 12 true cancers, 9 spread, pelvic or lumbar glands being affected in 7, one or both ovaries in 4, liver in 1, heart and lungs in 1.

Why cancer in all its forms so frequently affects the lower segment of the uterus seems to be accounted for by the fact that the neck and mouth of the organ, besides being extremely vascular, are subject to constant motion, and are very largely supplied with lymphatics. It is not surprising, says H. Arnott, that any morbid infiltration tending to rapid cell-growth and early decay should lead to extensive ulceration on a free surface in constant friction against an opposed similar surface. Such irritation would be certain in all cases to set up inflammatory processes in their immediate neighbourhood, and the irritating secretions of both uterus and vagina, tainted by the new addition, would speedily cause the spread of such malignant destruction in the manner so commonly witnessed. It should also be remembered that it is in the cervix principally that chronic inflammation, hyperplasia, hypertrophy, and all those changes take place which follow upon labour. These changes may be the starting point for malignant cell-growth, and may explain the comparative frequency with which this affects women who have borne children.

The *duration* of cancer is illustrated to a certain extent by the observations of H. Arnott. Dating from the time when the patient first complained of distressing symptoms—generally a flooding—the average duration of 57 cases of all kinds of cancer until the fatal termination, was 77·1 weeks. The average duration of the cases of true cancer was 53·8 weeks, of the cases of epithelioma 82·7 weeks; the two cases of sarcoma lived for a considerable period.

Cancer of the uterus is sometimes unfortunately *complicated with pregnancy.* This condition renders the cancerous growth more active; and, since the child must traverse the diseased tissues, labour can only be effected at the expense of dangerous or even fatal violence. West collected 74 cases of cancer complicating labour. In 41 death soon followed labour; 33 recovered from the effects of labour; 47 of the children were lost.

Dr. Cook (*Path. Trans.*, vol. x.) exhibited some fœtal bones found in the cavity of the uterus of a woman who died of cancer. Nine months before she had had an abortion. The uterus was large, firm, and infiltrated with a white granular deposit. The cervix was completely destroyed by an extensive slough. The extrusion of the dead embryo was probably prevented by a cancerous slough in the vagina.

The Modes in which Cancer Terminates.—Apart from the faint prospect of an occasional cure from treatment under favourable circumstances, the history of cancer of the uterus is scarcely brightened by a ray of hope. But to faith in the possibility of cure, spontaneous or surgical, the physician, not less than the patient, should nevertheless adhere.

1. *Spontaneous cure* is not absolutely impossible. On rare occasions Nature has accomplished the elimination of the disease. It may be said that there is a continuous attempt to throw off the diseased tissues manifested in the ulceration which occurs in the advanced stages. This ulceration consists really in necrosis or mortification of the superficial strata of the cancerous mass. Dr. Habit relates a case which is not altogether unique. Cancerous matter united the uterus to the surrounding structures; the vagina was filled with large granulations and fungous growths. Gradually all was replaced by firm cicatrix, and the uterus could no longer be felt. I have seen a case in which a similar process was partially carried out. I saw from time to time a woman who was affected with epithelioma of the uterus invading the roof of the vagina. During two years the disease was progressive, and at the end

of that time seemed to be rapidly marching to a fatal end by exhaustion, when a large mass of solid tissue infiltrated with cancerous disease was expelled. Temporary relief was felt. At a later period another mass as large as the first was cast, with renewed temporary improvement, but a large cloaca was left, into which the bladder and rectum opened; and I have no doubt long before this partial elimination took place, the lumbar glands had been invaded, so that the attempt at spontaneous cure came too late.

I am acquainted with another case which may be open to question as to accuracy of diagnosis, but in which there seems to me to be reason to believe that Nature effected a cure. Dr. Newman, of Stamford, was called to deliver a woman in labour at term, delivery being obstructed by an abnormal state of the lower segment of the uterus. The normal tissue of the uterus was replaced by a very unusual hardness, circular, uniform, and infiltrated apparently into the body of the uterus in every direction for more than an inch in extent. The cervix was eaten away at its posterior lip into a deep sulcus; the anterior lip was as hard as the posterior, irregular, with a hard nodulated or granulated feeling to the finger. The os felt to the finger as if it were an opening cut out of a piece of cartilage, perfectly hard and resisting. The deep sulcus, the small narrow orifice, and the thickened anterior lip, throughout denuded of epithelium, granulated, and furnishing watery oozing and sanious fluid, seen through the speculum, left no doubt that the case was one of extensive epithelioma of the cervix and lower part of the uterus. Dr. Ashforth and Mr. Heward carefully examined the case and concurred in Dr. Newman's opinion. The Cæsarian section was performed to remove the child. The mother made a good recovery. When again pregnant, Dr. Newman brought her to town to consult with me as to the course to be pursued. This was five years after the delivery just narrated. I found no hardness or disease of the uterus. We agreed to let the pregnancy take its course. She was delivered with little assistance. She died of conditions quite independent of the uterus. The uterus is figured in my "*Obstetric Operations*."

It may be conjectured that the disease was not cancer, but pelvic cellulitis. But on the other hand, the evidence that it was cancer must be admitted to be strong. I think it probable that the protracted labour caused such an amount of pressure upon the morbid mass as to produce mortification and elimination.

Montgomery gives a case of cure of cauliflower excrescence by pregnancy. Kiwisch observed a kind of gangrenous sequestration in a uterus affected with carcimona.

Dr. Gallard relates (*Union Médicale*, 1873) a case in which the entire uterus was expelled. The woman was thirty-five years old; the cervix uteri had been destroyed by cancer. She died twelve days afterwards from peritonitis, produced by the contact of virus. The expelled organ was carefully examined and laid before the Toulouse Medical Society in 1844.

In the breast the course of cancer is more open to observation; and here undoubted cases of spontaneous cure have occurred. Thus Samuel Cooper says (*Surgical Dictionary*), "One young woman whom I attended for a cancerous womb, of which she died, had an aged mother, who had suffered from cancer of each breast, but had latterly been freed from the disease by a sloughing process; an event which is uncommon, but does now and then happen."

A common mode by which cancer kills is by inducing (2) *exhaustion by hæmorrhagic and other discharges;* but I believe that other processes conduce to the fatal issue. There is almost always some degree of (3) *blood-poisoning.* And this comes from several sources. The constant necrosis and ulceration of the surface of the diseased mass produce a granulating vascular surface capable of absorbing the foul ichor which bathes it; hence ichorrhæmia. Another source is the intestine. Whenever cancer has proceeded so far that the disease has caught the rectum, obstruction either by direct compression, or by interference with the contractility of the muscular coat, leads to accumulation and partial retention of fæcal matter above. This induces retrograde dilatation of the intestinal canal. The arrest of the excrementitious matters in the dilated bowel is followed by decomposition, marked by distressing flatus. Absorption of the products of the decomposed and retained fæcal matter takes place. Hence another form of blood-poisoning—copræmia. It is greatly to this that the unhealthy and dirty-sallow aspect of the skin is due.

The cancer-juice is in many cases also absorbed. Evidence of this is seen in the infection of the glands, which arrest probably only a portion of the fluid in its transit towards the general circulation. The significance of the so-called *cancerous cachexia* is not always free from ambiguity. I have seen a woman who had no trace of cancer exhibit the appearance in a marked form. It was the sequela of typhoid. A cachexia hard to distinguish from the cancerous is not infrequent in fibroid polypus attended by partial necrosis of the tumour and retention of blood and necrotic *débris.* It is not due, I believe, to any specific cancerous empoisonment, but to the absorption of the foul necrotic and decomposing *débris* and discharges from the ulcerating surface. I have seen it disappear for a time when the morbid processes on the surface were arrested by treatment, just as the cachexia attending polypus disappears when the polypus is removed.

Added to these sources of blood-degradation, there is of course impaired nutrition to accelerate the sinking from exhaustion.

4. Cancer may also lead to *fatal ileus*, either by pressure or through adhesions, the result of the peritoneal inflammations which so often complicate this disease.

5. Some women die of actual *starvation*. Thus I have known cases of uterine cancer in which the hæmorrhage had ceased, and in which, from inability to bear any food, gradual exhaustion carried off the patients.

6. Combined with these causes of exhaustion and blood-poisoning, there is not infrequently such *a retrograde impairment of the urinary apparatus* that the function of the kidney is obstructed, and then urinæmia occurs. The obstruction beginning in the bladder, leads successively to dilatation of the ureters, of the pelvis of the kidney, and to atrophy of its secreting structure; that is, to amyloid degeneration or hydronephrosis. Suppression of urine ensues, and after two or three days coma supervenes. This is the sure forerunner of a fatal issue, usually by convulsions, which is seldom delayed beyond two or three days. But before the coma sets in the patient may show so little suffering beyond what she had long undergone that the imminent danger is hard to realize.

7. Rokitansky describes amongst the effects of cancerous infection *osteomalacia, anœmia, fatty and amyloid degeneration* of the *liver* and *spleen* as well as of the kidneys.

8. The circulation is yet exposed to another invasion. The vessels which supply the uterus run through the broad ligaments into the neck of the uterus on either side, just at the very seat of election of cancer. When the disease has extended into the connective tissue around these vessels, *mechanical compression* of the vessels ensues. They become embedded in a dense mass which quite destroys that freedom of motion and elasticity which characterize the healthy vessels; they are converted into rigid tubes, and these tubes are often contorted, and encroached upon by projections which destroy the evenness of their bores. The veins especially suffer from these changes. The blood moving with difficulty, subject to frequent delays, easily coagulates. Hence *venous thrombosis*, which is often promoted by the entrance into the blood of irritating matter which has the property of causing coagulation. This obstruction to the local circulation is probably a main agent in producing those profuse hæmorrhages from the free surface of the disease which are so characteristic of cancer. But it entails other consequences. The first is progressive thrombosis in the veins extending to the internal iliacs, then to the common iliacs, even to the vena cava. The obstruction of the common iliac vein of course leads to obstruction of the external iliac, and the effect of this, concurrently with the necessary clogging

of the lymphatics, is seen in *phlegmasia dolens* of the leg. And no doubt the lymphatics are affected like the veins. When it comes to this the end is not far off. As far as I know phlegmasia dolens from cancer of the uterus is incurable. The sufferer lingers for a few weeks, perhaps, until life is extinguished by advancing exhaustion, unless another event, 9, *embolism*, occur to precipitate the fatal issue. In some cases I have seen the iliac veins and some inches of the vena cava filled with a dirty, soft, pulpy clot, resembling unhealthy pus. It cannot be a subject of surprise if matter so degraded easily gives rise to detached fragments, which are carried into the heart and thence into the pulmonary arteries. I have seen a lady die of phlegmasia dolens consecutive on cancer of the uterus, and embolism of the brain inducing hemiplegia. When, however, phlegmasia dolens supervenes on operative proceedings, as amputation of the cervix, it may be due to accidental septicæmic irritation, and this may subside. Of this I have seen several examples.

10. I have seen several *sudden deaths* in women suffering from cancer of the uterus. They have occurred under circumstances which involved an unusual physical exertion or emotion. In one such case, that of a woman in St. Thomas's Hospital, I found conditions which, to my mind, explained the catastrophe. The pelvic organs were matted together by the cancerous disease, the lumbar glands were infiltrated and enlarged, and these, with similar infiltration of the connective tissue, surrounded and fixed the aorta and vena cava nearly as high as the diaphragm. The elasticity of these vessels was thus quite destroyed. The aorta was virtually a rigid tube; and the vein was bulged in in many places by the projecting masses outside. In the left heart were large decolorized fibrin-clots. Under such conditions, the circulation cannot go on well. Under the slightest increase of impulse of the heart, a difficulty would arise in the transmission of the volume of the blood projected by it into the narrowed rigid aorta; this would react upon the feeble heart, cause a struggle and asphyxia. In this particular case there were no emboli or thrombi found in the pulmonary arteries.

In many cases, concurrently or not with the consolidation of the broad ligaments, *peritonitis* supervenes, either being the immediate cause of death, or leading to ulterior trouble by matting together the adjoining organs, and thus impeding them in the execution of their functions.

11. Death, more or less sudden, may be caused by the shock attending *perforation* into the peritoneal cavity. Dr. Priestley showed to the Obstetrical Society (1870) a specimen of a carcinoma of the body of the uterus. Death took place with symptoms of collapse. Perforation had taken place through

the anterior wall of the uterus. A similar case occurred at St. George's. I exhibited the specimen to the Obstetrical Society, 1878.

Peritonitis may be excited without perforation of the peritoneum. In this case it is probably caused by the irritation of the cancer growth in the structures immediately invested by the peritoneum. The peritonitis in these cases is of a chronic kind, and conduces to a fatal issue in a remote or secondary manner, as by causing obstruction to the action of the intestines. But sometimes the ulcerative process eats through the peritoneum, and thus sets up inflammation in this membrane, which may be the immediate cause of death.

It may also be excited by a process of local septicæmia and thrombosis, extending along the veins and lymphatics, coming from the morbid mass towards the peritoneal surface of the uterus, or in the broad ligaments.

12. *Secondary tumours* may arise in various parts and interfere with the functions of important organs; for example, such a tumour may obstruct the hepatic duct, and induce jaundice, disorganization of the liver, and thus death; or cancerous deposits, embolic or developed in some other way, may form in the brain or lungs, and so harass these organs as to bring life to a stand.

Symptoms and Diagnosis.—I believe the sign that most frequently arrests attention in the first place is *hæmorrhage*; and then, when we examine, we find the disease far advanced. In several cases the first thing to suggest the presence of disease has been hæmorrhage on sexual intercourse. *Pain* of a marked character, even the stabbing, lancinating pain described as almost pathognomonic of cancer, is often absent for a long time. So long as the disease is limited to the cervix uteri there is commonly little pain. But when it has extended beyond, and especially in the last stages, pain is often constant and agonizing, destroying rest. Pain and swelling above the groin in the iliac region show extension of the disease to the lymphatic glands and peritonitis. Broca and Cornil have shown that where women have long suffered extreme pain in the thighs, legs, and nates, there has been either an epithelial neoplasm or hypertrophy of the cellular tissue of the neurilemma of the sciatic or crural nerves, and that some nerve-tubules are partially affected, the medullary substance being transformed into granular fat-molecules. The pains have a radiating character, starting as it were from the centre of the disease, and shooting to the sacrum, vertebral column, loins, groins, and thighs.

In the earlier stages, no particular *odour* is perceived, but when ulceration has begun, an odour, penetrating and offensive, is almost certain to be emitted. It is so peculiar that frequently by it the presence of a cancerous patient is made known. It clings tenaciously to the linen and to the examining finger.

In advanced cancer the *aspect* of the patient is often enough to excite a strong suspicion of the nature of the disease. Emaciation is general, but not constant. The skin acquires a dirty straw tint, indicative of a profound alteration in the properties of the blood, and of impaired nutrition. It is true that a very similar tint is often seen in women who have long been draining from polypus or inversion of the uterus. But internal examination at once clears up the diagnosis. The alteration referred to is due to three causes: the influence of the cancerous cachexia, which, as Becquerel has shown, first destroys the globules, and afterwards diminishes the quantity of albumen; to the hæmorrhages, which very quickly diminish the globules; and to the serous discharges. Thus the water of the blood increases; the globules and the albumen diminish. The cancerous cachexia is sooner or later followed by *hectic or irritative fever.*

Sooner or later *bladder-distress* almost always comes. The first symptom to arrest attention is often dysuria or partial incontinence of urine, so that examining the bladder we find to our surprise, cancer of the uterus. At a later stage the urine may all escape by a fistulous opening into the bladder near the cervix uteri. I had a case in St. Thomas's Hospital, where a valvular cicatrized opening into the bladder near the os uteri was the only opening found, the ordinary meatus urinarius being undiscoverable. Urine escaping from a fistula into the vagina may be retained there by the sphincteric action of the vulva, and thus mixed with blood from the cancerous surface may when voided appear as *hæmaturia.* I have several times known this apparent hæmaturia to be treated as due to bladder or kidney disease.

The distinctive indications are different in the cases where cancer attacks the cervix, and in those where it attacks the body of the uterus.

The diagnosis of cancer of the uterus in the early stages is beset with difficulties. The opportunities of studying the disease at this stage are so rare, that, even when seen, for want of knowledge of its characteristics it may escape recognition. Thirty years ago there can be no doubt that cases of simple hypertrophy or inflammatory engorgement were not infrequently assumed to be cancer; and credit was asked for having cured them. Duparcque, Lisfranc, Ashwell, and Montgomery certainly fell into this error. And, notwithstanding the more accurate knowledge since extended, mainly through the researches of Téallier and Henry Bennet, of the consequences of inflammation of the cervix uteri, enabling us in most cases to eliminate these conditions, the clinical observer is still liable to mistakes.

Syphilitic condylomata forming on the vaginal-portion may simulate epithelioma. The cancerous disease may be distinguished by its more rapid growth, by its greater tendency to hæmorrhage and necrosis, but most surely by the test of treatment. Under cautery and constitutional treatment the syphilitic disease quickly yields. Not so the cancerous disease.

The characters assumed by the os and cervix uteri during the earlier stages of medullary cancer are less familiar and therefore less clearly defined than those which mark the later stages. At first, whilst strictly localized in the cervix, the cervix is larger than natural, and one or more bumps of the size of half a nut, hard, resisting the finger, quite insensible, may be found on the lips of the os uteri. There is often, also, some puckering of the os. At this stage the mobility of the uterus is not impaired. Through the speculum these bumps show a violet-red tint, quite distinct from the rosy tint of the rest of the cervix. Up to this time, and indeed long after, the patient may still exhibit the outward signs of florid health.

A characteristic form of malignant disease of the os uteri in the earliest stage is due to the extension or spreading of the superficies of the os, whilst the cervix above remains the same. This gives the figure of a *mushroom* to the part. It is true that ordinary hypertrophic elongation of the cervix begins somewhat in a similar way; but the "cancer-mushroom" is distinguished by its more complete resemblance to the mushroom shape, the spreading proceeding all round the os; and by the everted os of hypertrophy presenting a smoother surface. Malgaigne describes the "*Champignons cancéreux.*"

Another form not less characteristic might be described as the "*cancer-crater.*" A rough jagged edge forms the boundary between the vaginal orifice of the cervix and the cervical cavity, which is scooped out beyond the crater-like orifice. But this character is more often found in ulterior stages.

In forming the diagnosis of cancer, the speculum and sound are commonly useless—except in the very earliest stage—and may be injurious. The tissues are brittle; they often bleed freely even on the slightest touch of the finger; and if the speculum is introduced greater injury is caused, and the effused blood obscures what might otherwise be seen. The finger by the vagina and rectum tells all that is necessary to establish the melancholy diagnosis.

Cancer, when limited to the vaginal-portion, that is, whilst the uterus still retains its mobility, has to be distinguished from the various conditions of inflammation, hypertrophy, and non-malignant tumours of this part. The condition most likely to give rise to error is hypertrophy of the follicles of the os uteri from occlusion. This condition produces small nodular projections, the centres of angry, vivid congestion. They differ from commencing cancer, in showing a whitish translucent centre, due to the retained mucous secretion; and in being curable by puncture. But it sometimes takes time for observation before a sure diagnosis can be formed. Perhaps the best training for the eye to the recognition of early cancer of the os uteri is obtained by the observation of the appearance of commencing cancer at the mucous outlets of the body, for example at the vulva, anus, mouth, nose, and eyes.

When cancer has spread from the vaginal-portion to the roof of the vagina, the cellular tissue between the cervix and bladder to the broad ligaments, the uterus will almost necessarily be set fast. The primary disease of the cervix will be partly obscured by the secondary surrounding disease. It is in this condition chiefly liable to be mistaken for perimetric inflammation and inflammatory deposits. An important distinction, often available, lies in this: in cancer the disease is *in* the cervix itself; in perimetritis it is *around* the cervix. Some cases of fibroid tumours distorting the cervix, and fixing the uterus in the pelvis, may give rise to error.

In both cases the vaginal-portion is commonly brought down into a lower plane; it is more easily reached. But it is especially in advanced cancer that the diseased mass is often carried so low down that the finger scarcely penetrating the vulva strikes at once upon it. And there are other points of distinction. By the time that the uterus is set fast by cancer, other characteristics are usually pronounced, as hæmorrhage, foul discharges, pain. Perimetric inflammation, too, has a different history; it dates from an epoch pretty clearly defined, beginning with labour, abortion, or menstruation.

Foul-smelling, irritating discharge occasions great anxiety, because it is a popular belief that these characters are peculiar to malignant disease. But they are, in truth, acquired by the retention of discharges in the vagina.

When cancer begins in the body of the uterus, the mobility of the organ may not be interfered with until very late in the course of the disease. It may be mistaken for endometritis, with or without sub-involution; for hypertrophy with engorgement; for fibroid or other non-malignant tumours, especially those of the sub-mucous or polypoid kind. One point of distinction, sometimes available, consists in the origin of the disease. Fibroid tumours begin in the muscular wall of the uterus, cancer more often on the mucous surface.

A feature valuable in the diagnosis of intra-uterine cancer is the following:—The morbid tissue projecting into the cavity shortens it, so that the sound may penetrate two inches only, or less; at the same time the walls become incapable of collapse, they remain rigid, are kept apart, forming a spherical hollow, rough inside. When we get this condition we may conclude that the disease has laid hold of the walls of the uterus, altering their physical property, destroying contractility. This is one cause of congestion and bleeding. If the uterine walls are felt yielding, if the anterior wall can be flattened upon the posterior, there is rarely cancer of the body of the uterus. Chronic metritis may induce a somewhat similar condition, but it will be less marked than that produced by cancer.

Pain is usually more intense, and comes on earlier in the cases where cancer invades the body of the uterus. This pain is, to a certain extent, diagnostic. Metritis and non-malignant tumours are not usually attended by pain so agonizing or so unremitting. But still even this symptom is not constant. For example, I saw in consultation with Dr. Byass and Dr. Saunders a lady, aged about fifty, a pluripara, who had ceased menstruating for two years. For three years she had been subject to constant sero-sanguineous discharge, and her health had become impaired. I found the vaginal-portion of normal size, os closed; the uterus was moveable, and its body was enlarged, firm, regular in form. The diagnosis was entered interrogatively as intra-uterine polypus, fibroid or malignant disease of the body of the uterus. I recommended dilatation by tents to explore the interior. Four months after this she died, and Dr. Saunders sent me the following account: "It turned out to be encephaloid cancer of the body of the womb. The following circumstances are remarkable: its duration of nearly four years; the absence of any intense pain; the absence of hæmorrhage, the only discharge being considerable quantities of blood-stained serum of offensive odour, and this suddenly stopped about a month before death; the perfect integrity of the os up to the very last, there being slight thickening, and its contractile power retained. At the post-mortem the whole of the fundus uteri was in a broken-down condition, exhibiting the signs of encephaloid, the microscope subsequently verifying them. The patient died from asthma, there being hardly any prominent signs of the disease up to the last. I diagnosed, however, from the general cachexia and increasing weakness without an explainable cause. There were no secondary deposits in other organs; the liver was, however, in a state of amyloid degeneration." Pain is due partly to the stretching of the muscular fibre, partly to the contractile efforts aroused by the parasitic growth, partly by the pressure of the enlarged uterus upon surrounding structures, partly to the invasion of surrounding structures by the disease, and partly by the nerves themselves being affected by it. In some cases reflex irritation produces pain in distant parts, and vomiting is not infrequent, especially in the advanced stages.

After lasting some time, the cervical canal will commonly undergo some dilatation.

But the surest test of intra-uterine cancer is to bring away small fragments of the superficial projections from the cavity, and subject them to microscopical examination. In describing endometritis, we have seen that there are cases in which small pisiform excrescences exist, whose nature, or rather whose history, is for a time a source of doubt. In endometritis or metritis not complicated with cancer, the walls of the uterus are less rigid.

This preliminary dilatation of the cervix may be effected by tents. This dilatation will also permit of digital exploration. Then Sims' curette may be introduced and a shred easily scraped off. The patient under chloroform, the hand may, if necessary, be passed into the vagina, the finger will then easily survey the interior of the uterus, and recognize the pulpy projections of malignant disease. Thus dilatation effected for diagnosis is useful for treatment.

As a guide to treatment, as well as to prognosis, it is important to distinguish the *kind* of malignant disease. Thus outbreaks of cancerous disease are comparatively frequently met with in neighbouring glands, or in remote viscera. This furnishes a strong argument against hasty operative interference with a view to extirpating the disease. These secondary foci being greatly more common with true cancer than with epithelioma, the microscopic examination of the morbid structure becomes of great importance in determining on a line of treatment.

" The scrofulous ulcerations are almost always accompanied by considerable engorgement of the cervix uteri." On the other hand, under the microscope, the softened matter is found not to consist of the elements of tubercle, but of epithelial cells similar to those of the uterine mucous membrane, while the indurated callous structure which forms the base of the ulcer is formed of a mixture of fibro-plastic and epidermoid materials. Robin says this kind of ulcer is to the uterus what lupus or cancroid ulcers are to the face.

The *prognosis* may in general terms be said to be settled when the diagnosis is determined. It is henceforth limited to the questions, How long will the patient survive ? In what manner and to what degree will she suffer ? Of course, if we adopt the more hopeful doctrine that at the initial stages the disease is a local one, the prognosis will be favourable in cases where the diagnosis is formed, whilst the disease appears to be isolated in the vaginal-portion in such a manner as to admit of complete amputation or destruction. But it is precisely in these cases that diagnosis is liable to be fallacious ; and erroneous diagnosis will vitiate the prognosis.

What is the *duration* of cancer of the uterus ? As the early stages so often escape detection, it is not easy to determine the total duration. It is probable that the stage before ulceration, of limitation to the cervix, may last for some months, even two or three years. When ulceration has begun, the downhill course is often rapid.

Prognosis will be affected by treatment. For example, if the disease be allowed to run its course uninterrupted, the fatal termination will in many cases come at an earlier date than in those cases where judicious surgical treatment has been adopted. It is very difficult to set out this comparative statement in figures. But a comparison of cases seems to justify certain deductions. Thus we take two cases of cauliflower excrescences, apparently chiefly limited to the vaginal-portion, and amputate as far as we can the diseased mass in the one case, and avoid surgical treatment in the other. We may pretty confidently predict that in the second case hæmorrhage, watery discharges, and general infection will destroy the patient in a few months. We may with equal confidence predict that, if the diseased mass be fairly removed, the destructive processes will be arrested for a time, and that the patient's life will be prolonged. I have known a patient recover so far that she and her friends believed recovery to be complete; she became pregnant three months after operation, and was delivered by artificial induction of labour at the end of eight months' gestation. At this time there was return of the disease, but her general health was good. At the time of the operation she was so reduced by hæmorrhages, and the disease was so progressive, that it seemed highly probable that she would sink within three months.

So in some cases of superficial malignant disease, whether of the cervix uteri or of the interior of the body of the uterus, the removal or alteration of the diseased surface by actual cautery, by nitric, chromic, or acetic acid, by iodine, bromine, or by scraping, has stopped bleeding and decomposition, and thus cut off a source of blood-infection. Patients so treated have improved considerably, and it cannot be doubted have had their lives prolonged, and made for a time more endurable.

In not a few cases of epithelioma in which no decided local treatment has been employed, life has been prolonged several years after the disease has been recognized; and we have no means of estimating how long it had existed before recognition. In cases of this kind the disease is not uniformly progressive. It seems to proceed by stages with intervals of halt. For a time, seldom indeed very protracted, the disease may even appear to be so completely arrested that the patient is tempted to accept the reprieve as a promise of cure. If one of these delusive halts coincide with a new treatment, especially if backed up by the bold assurances of a "cancer-curer," she eagerly interprets all things according to her wishes, and builds up upon this transitory foundation the most confident hope of recovery.

These alternations of progress and arrest suggest another reflection which it is very important to bear in mind when we are called upon to pronounce a prognosis. If we express an adverse opinion without such qualification as the uncertain march of the disease demands; if, straightway, on forming a diagnosis of cancer, we declare the nature of the disease and venture to foretell a brief duration of life, especially if we assign a specified limit, we commit a twofold error. One error inflicts needless misery on the patient, the other falls back with not undeserved retaliation upon ourselves. To utter the word "cancer," and to say the sufferer has only a short time to live, is literally to pronounce sentence of death unmitigated by the hope of reprieve. Such a sentence, whenever it comes, even after long and advancing disease, even after sufferings to escape from which death may have been often silently invoked, falls like a crushing blow, adding to physical torture the agony of despair.

Cancer differs in this respect from phthisis in its effect upon the mind. The buoyant hope that to the last so often sustains the subject of phthisis, that flatters him with the belief that the doctors are mistaken in his case, that there is nothing serious in it, has little or no place in cancer. It may be confidently said that, whereas many persons struck with incurable phthisis, refuse to believe in this reality, few or no persons struck with cancer long indulge in such a dream. Many who have no sign of cancer are ready to believe that they are suffering from the disease; few or none who are really suffering from it fail to recognize their condition. And this they will do, although the physician may never have uttered the word.

The error that rebounds upon the physician who is too hasty to condemn is this:—Not long after he has passed sentence the patient unexpectedly improves, or thinks she does; one of those delusive halts is reached, and "another opinion," possibly less skilled and less honest than his own, encourages the welcome belief. For the time he is discredited; to the patient's own injury probably he is discarded. And when at length the inexorable disease resumes its fatal course, he will hardly be forgiven. And as an additional caution against an absolute and uncompromising condemnation, humility should suggest the possibility of error in diagnosis.

The proper course in framing an opinion, one dictated by truthfulness, the first law, by the modesty which is conscious of fallibility, and tempered by mercy, is to explain that the case is only to a certain extent amenable to treatment, that, whilst some improvement may be expected, it is likely to be temporary only, and that the usual course of the disease when once established is to shorten life. The patient will almost invariably draw the true significance from such expressions. She will believe that she has cancer. But she will be grateful for having been spared the cruel word.

The *treatment* may most conveniently be discussed under the leading heads of *curative* and *palliative*. The first question which always challenges attention is that of curability. In the great majority of cases when first seen, unhappily, this is quickly answered in the negative. The disease has gone too far, or it has assumed a form which precludes the idea of removing it. But in a certain number of cases, the disease is sufficiently isolated in the vaginal-portion to justify the attempt; and in some cases of epithelioma of the cavity of the uterus, where the disease is ascertained to be superficial, an attempt to remove or destroy the diseased surface may also be made. The epithelioma or cauliflower excrescence of the vaginal-portion offers the best prospect of cure by amputation. The best test of the fitness for amputation, I think, is the freedom in mobility of the uterus. Amputation was at one time a mode of dealing with cancer of the uterus much in vogue. But it would be useless to invoke the experiences of the past generation of surgeons as to the efficacy of their practice, because error of diagnosis vitiates it to an unknown extent.

The following historical account is from Samuel Cooper:—

"According to Baudelocque, the excision of the cervix uteri was first suggested in 1780, by Lauvariot. M. Tarral even ascribes it to Tulpius; but the tumours which the latter took away were, according to M. Velpeau, evidently polypi. Lazzari, who puts in a claim for Monteggia, is also believed to have made a similar mistake; nor has M. Velpeau been able to satisfy himself that the operation was ever performed by André-de-la-Croix and Lapeyronie, as M. Tarral represents. Troisberg recommended it, however, in 1787; and, as a critical writer observes, sometimes the cervix uteri was removed accidentally with the knife by ignorant persons, who mistook it for a polypus. (See *Edin. Med. and Surg. Journ.*, No. 103, p. 377.) Professor Osiander, of Göttingen, first executed the operation in 1801, on a widow, whose vagina was filled by a very vascular fœtid fungus, as large as a child's head, growing from the orifice of the womb. By means of Smellie's forceps, the fungus was drawn down; but it broke off, and a tremendous hæmorrhage ensued. The operator, without loss of time, introduced several crooked needles, armed with strong ligatures, through the bottom of the vagina, and body of the uterus, until they emerged at the os tincæ. These ligatures served to draw down the uterus, and retain it near the mouth of the vagina. Osiander then introduced a bistoury above the scirrhous portion, and divided the uterus exactly in the horizontal direction: for an instant the bleeding was profuse, but it was quickly stopped by means of a sponge, saturated with styptics. In about a month the woman recovered. Osiander afterwards performed eight similar operations upon different patients, all of whom are reported to have experienced a cure. The observations of Osiander were no sooner promulgated in France, than M. Dupuytren adopted the new operation, and made numerous trials of it. M. Récamier followed Dupuytren; so that, by 1815, the excision of the cervix uteri had become in France a common operation. However, it remained for M. Lisfranc to extend the practice, and to convince the most incredulous of the little danger resulting from it. (M. Velpeau, *Nouv. Elém. de Méd. Opér.*, t. iii. p. 615.) Dupuytren also performed the operation eight times; but, instead of employing the ligatures and knife, as Osiander did, he drew down the uterus with hook forceps, and divided it above the scirrhous part with curved knives and scissors. One of the patients, on whom Dupuytren operated, had a return of the disease, and submitted to a second operation with no better result; but was afterwards effectually cured by the application of caustic, with the aid of the speculum invented by M. Récamier.

"Even with regard to the excision of the cervix uteri, it is perfectly manifest to me that many of the cases in which it was performed were not truly cancerous. Doubts may be entertained, I think, whether the enormous tumour removed in the very first instance of such operation by Osiander was really a cancerous affection."

In Guy's Museum is a preparation (No. 2259^{20}) of the vagina, bladder, rectum, and part of the colon of a woman, from whom Dr. Blundell a year before death had removed the whole uterus for cancer; disease invaded rectum, vagina, &c., which proved fatal, but complete union had taken place between the pelvic organs.

Dr. Wiltshire has recorded (*Brit. Med. Journ.*, 1873) a case in which the entire uterus was accidentally brought away or sloughed off after an operation, which consisted in scraping the diseased surface. Some cicatrization of the vaginal roof took place, but the disease returned.

The question of *total extirpation of the uterus* is one that scarcely admits of discussion. The circumstances under which it can be seriously contemplated must be very rare. West gives a table of recorded cases of total extirpation of the uterus on account of cancerous disease. In three only did the patient survive the operation, and that only for a month; in twenty-two death was the consequence.

The Selection of Cases for Amputation of the Vaginal-portion.— There is one class of cases in which there should be no hesitation in operating. Just as the surgeon recognizes the propriety of amputating the breast when the tumour is clearly circumscribed, moveable, and no evidence of glandular or constitutional infection can be traced, so should he when similar conditions are found in connexion with cancer of the uterus If, then, we find the uterus freely moveable, a distinct neck above the diseased portion, so that we can work beyond the disease in sound tissue, and especially if the disease is ascertained by microscope to be epitheliomatous or cancroid, it is our duty to amputate. This should be done whether profuse bleedings occur or not. The plain course is to anticipate the evils which will certainly come if we leave things alone. Complete cure is not hopeless; and a long respite may be confidently looked for.

In another class of cases the indication, although not so urgent, is still clear. I refer to those cases in which a certain degree of mobility of the uterus remains, but in which the base of the disease has caught the roof of the vagina, so that no distinct neck or demarcation between healthy and diseased tissue can be made out. If a cauliflower-growth be found under such conditions, and be the source of hæmorrhagic and other discharges, the ablation of so much of the diseased mass as can well be surrounded by a wire should be attempted. For a time, at least, the disease will be stayed. And there is little drawback in the shape of danger from the operation to deter from its performance. Where the vaginal-portion is attacked by medullary cancer, whilst in the stage of localization, especially in the mushroom form, the uterus being still moveable, amputation should be performed.

The fixing of the uterus being generally due to the extension of the disease to the roof of the vagina, the base of the bladder, and the broad ligaments, is evidence that it has passed the boundary where it can be reached by topical remedies. This fixing is also, I think, in many cases evidence that the disease has invaded the lymphatic vessels and glands, a still further discouragement from resort to severe surgical treatment.

When the operation is determined upon, we have to consider the best mode of performing it. If we use the knife or scissors, especial care must be taken to avoid opening the roof of the vagina behind, and perforating the retro-uterine peritoneal pouch. To obviate this accident, which might be fatal, the vaginal-portion of the uterus must be carefully isolated from the vagina. Dr. Emmet (*Amer. Journ. of Obstetrics,* 1869) recommends before amputating to examine whilst the patient is placed on her knees and elbows. This, by favouring gravitation, enables us to note the length of the neck more accurately, since, in the ordinary posture the neck is always apparently longer from prolapse of the uterus.

But since it is almost indispensable to the use of the knife or scissors that the whole uterus be brought low down near the vulva, there must always be danger of drawing down the roof of the vagina and the retro-uterine peritoneal pouch with it. And in pursuance of the object to divide the cervix as high as possible in order to get into sound tissue, the danger of opening this pouch is serious. It constitutes an important objection to this mode of operating. The objection applies also to the chain-écraseur, which is very apt to drag in the peritoneal pouch. It applies in a minor degree to the single-wire écraseur. But the galvano-caustic wire is almost wholly free from this objection. The knife and scissors, and the single wire, further entail serious danger from hæmorrhage. To arrest this it may be possible to transfix the stump with a curved needle carrying a silver wire. But the best way is to use the actual cautery. Copper or iron cauteries should always be ready when this operation is undertaken.

The Operation of Amputating the Vaginal-portion of the Uterus affected with Malignant Disease.—By far the best plan is to use the galvano-caustic wire. The patient is placed under chloroform in lithotomy position. (See p. 640.) Sims' speculum is introduced to keep well back the perineum and posterior wall of the vagina. An assistant on either side holds open the lateral and interior walls of the vagina by small retractors. The diseased mass thus well exposed is seized as far back as possible with a vulsellum, taking care not to tear through the fragile structure. The mass thus brought forward near the vulva partly by gentle traction, but more by the firm pressure of an assistant's hand upon the fundus uteri applied above the symphysis pubis, is then encircled by the cold platinum-wire loop passed over the vulsellum. The loop is then accurately adjusted by the finger close to the base of the mass, and therefore close to the roof of the vagina. The slack of the wire is then drawn in, so that the loop, tightly embracing the root of the mass, buries itself in a groove all round. The heat now being turned on burns at once into the part to be removed, leaving the vagina quite secure. The loop is gradually screwed up as the burning proceeds. There should be no hurry in this proceeding. The wire being fine is rapidly cooled by the tissues; it must have time to renew its heat, so that the substance is *burnt through, not cut by over-tightening the loop.* This slow process gives more effectual security against hæmorrhage, and the more thorough burning of the surface also destroys more effectually the remains of the disease in the stump. When the wire has burnt its way through, the diseased mass is removed by the vulsellum, and the stump is carefully examined. A series of concentric rings mark the alternate incandescent and cooler states of the wire in its progress. The bleeding is generally arterial; one or more fine spirts may be seen. These I have always succeeded in staunching by the actual cautery applied by the galvanic porcelain button. Light swabbing with small bits of sponge soaked in iced water will facilitate the search for bleeding points. And it is well to syringe out the vagina by playing a stream of iced water against the stump. All bleeding stopped, the vagina should be firmly, not tightly, packed with strips of lint soaked in carbolic oil.

It is sometimes more convenient to place the patient in the semi-prone posture. The wire may be adjusted round the base of the tumour by the finger without the aid of speculum or retractors. We are kept informed of the progressive action of the cautery by hearing the hissing sound it produces, and applying light gradual traction upon the loop whilst there is resistance. When the resistance ceases and the wire-loop comes home we know the tumour is severed. It is then removed by finger or vulsellum, and the duck-bill speculum is introduced to obtain a full view of the stump and enable the operator to staunch any bleeding.

The after-dangers are: hæmorrhage and retention of urine. The first may be arrested for a time by further plugging. If this fail, all plugs should be removed, and the stump swabbed with perchloride or persulphate of iron. If this fail, the patient must be placed in lithotomy position, the part exposed by Sims' speculum, and the bleeding points or surface seared with the actual cautery.

The carbolic oil dressing may be removed next day, and a single strip of lint soaked in the same fluid may be renewed daily for a week. After this, washing out with Condy's fluid, or weak chloride of soda, will be useful. The surface will granulate and may cicatrize in two or three weeks. The os uteri should be watched, the sound being occasionally passed to obviate cicatricial closure. It would be better to abstain henceforth from sexual intercourse. I have known pregnancy to occur after the operation.

The stump, or granulating surface, may be sprinkled every three or four days with powdered sulphate of zinc; or if any sprouting of malignant excrescence show itself, it may be kept down by nitric acid or chromic acid.

As already stated, amputation is sometimes advisable even when there is no reasonable hope that the operation will be curative. It is quite justified in some cases where the disease has extended beyond the vaginal-portion, on the principle sanctioned by experience, that much good is effected by removing the most active portion of the disease.

The proceeding next in order to ablation by wire or cautery, is *scraping*. This may be practised by Récamier's or Sims' curette, or by special instruments designed by Simon. It is more especially applicable to cases where the diseased mass is not so far isolated or raised above the level as to admit of surrounding by a wire, and yet where the morbid surface is rough, foul, easily bleeding. The scraping is performed by decided strokes, so as to scrape off the superficial layers. Sometimes the bleeding stops by this treatment. But on the other hand, it is sometimes increased. I never resort to it without having at hand an iron or copper cautery or Paquelin's apparatus to sear the surface afterwards; and in the greater number of cases the actual cautery is better used alone.

Amputation of the diseased part is not the only method which has been proposed and practised with the view of curing cancer. As in the case of cancer of the breast various caustics have been employed—as the chloride of zinc, Vienna paste, and others. (See Cooper's *Surgical Dictionary.*) Their use with the view of destroying the diseased mass is now, I believe, generally abandoned. But quite recently attempts to effect a radical cure by acting upon the cancerous growth have been made on a somewhat different principle. Bromine in solution has been recommended by Dr. Wynn Williams and Dr. Routh to be applied on pledgets of lint to the diseased surface. In some cases it has appeared to check the disease by destroying the vitality of the cancer-cell. I have used it extensively, and have acquired the impression that disease is checked by it. And there is no doubt that it is most effective as a deodorant. Dr. Broadbent (1866) recommended acetic acid on the following reasoning: "Cancer owes its malignancy to its characteristic structure . . . . . To alter its cells is to put an end to their power of dividing and multiplying, and consequently to arrest the growth of the tumour. In acetic acid we have an agent which on the microscopic slide rapidly effects important changes in cells of every kind, dissolving the cell-wall and affecting the nucleus. Not coagulating albumen, it may diffuse itself through a tumour, and, reaching every part equally, it may probably produce similar results when the cells are *in sitû.*" He injects equal parts of acetic acid and water. I do not know how far this proposal has borne the test of clinical experience. But it seems that a hope of controlling this hitherto intractable disease may be found in its further pursuit. In one case in which I repeated the application several times, phlegmasia dolens supervened. The patient died. Dr. Skene (*Amer. Journ. of Obstet.*, 1869) inserted arrows of chloride of zinc into a presumed cancerous affection of the cervix uteri; recovery resulted.

More lately chromic acid, nitric acid, and strong bromine have been used, more with the object of improving the superficial condition of the diseased surface, and of retarding the march of the disease, than with the hope of cure.

The strong disposition to thrombosis in the pelvic veins in cancer must be considered in dealing with cases of this disease. The process may be started by the remedies employed, and thus the fatal issue may be precipitated. The actual cautery, and sulphuric acid, chromic acid, perchloride of iron, may easily cause coagulation of the blood in the vessels near the surface where they are applied, and the thrombi so formed may spread backwards. The rule for this application may, I think, be laid down as follows:—If our hope is to cure or materially arrest the disease, the cauterizing agent must be applied boldly to the disease, so as to cause a slough of some depth. Now this cannot be done safely if the disease is not limited to the cervix or the lower part of the uterus. If the uterus still retain its mobility we have a reasonable assurance that the disease has not invaded the connective-tissue and vessels in the broad ligaments around the cervix. Under these conditions the caustics may be freely applied. But if the disease have extended high up in the cervix it will not be judicious to apply the cauteries named so freely as in the first order of cases. There is, however, another indication for the use of powerful cauteries—namely, to arrest profuse hæmorrhage and to alter the character of the discharges. This may commonly be most effectually done by a superficial application of strong chromic acid, nitric acid, or perchloride of iron, or the actual cautery. The bleeding is quickly controlled; and a thin slough is formed which, when thrown off, leaves a comparatively healthy granulating surface, from which for a time the discharge is not offensive. Considerable constitutional improvement often attends the local change.

Mr. Campbell de Morgan says,* in reference to the caustic treatment of cancer, there is an evil attending slow cauterization, namely, that while the caustic is doing its work increased action is going on in its neighbourhood, with augmented growth of that part of the cancer which the caustic has not yet reached. If the whole diseased structure be not included in one operation, the chances are that the undestroyed tissue will grow with greater rapidity, and quickly affect distant parts. Still, in many cases the method by gradual cauterization is safe and effective. He, however, urges it as an absolute rule that if caustics are employed with a curative intention, they must be used fully and decisively.

Latterly Dr. Routh has advocated the topical use of *pepsine*. Two successful cases had been published by Drs. Tansini and Pagello (*Gazetta Med. Lomb.*, 1869). Dr. Routh employs this agent in the following way:—He first destroys the surface of the morbid growth by the actual cautery, by scraping, by bromine, or other agents. A raw surface thus obtained, or even whilst the slough still remains, he applies the gastric juice on a piece of lint, by help of a speculum. This is covered by a piece of oil-silk, and supported by a plug. This should be done twice a day, oftener if practicable. The digestive property of the pepsine acts powerfully upon the morbid structure. He reports cases in which decided benefit, even cure resulted. Of course the objection has been raised that the cases were not cancer. But the proper course, it appears to me, is to pursue the treatment in cases whose nature is not doubtful. I have seen one case treated in this way. I was satisfied that the solvent and antiseptic action of the remedy upon the diseased surface was great and beneficial. All objections of a theoretical kind must ultimately fall before the evidence of clinical experience. But we should remember that pepsine does not act upon the structure of the living stomach; that it only acts vigorously on dead tissue. At one of the first meetings of the Pathological Society I exhibited the stomach of a woman, a great part of which had been dissolved after death by its own gastric juice. John Hunter's observations on this subject are well known. In its application to cancerous growths, as advised by Dr. Routh, a slough is first formed. This will be easily dealt with by the pepsine. But further observations are desirable to try how far the pepsine can be made to act upon the deeper parts of the living morbid substance.

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* "The Origin of Cancer considered with Reference to the Treatment of the Disease." 1872.

I do not refer to the use of arsenic in this connexion, on account of the danger there is of poisoning the system when applied in quantity sufficient to do any local good to an ulcerating absorbing surface.

In the case of sarcoma beginning in the body of the uterus, if we have the opportunity of recognizing the disease in its early stage whilst limited to the lining membrane, caustics may be applied decisively, the cervix uteri having been previously dilated to allow this to be done. But this form of malignant disease also tends to advance into the cervix attacking the region where the vessels enter. When it has reached this point, and especially if any marked amount of fixing of the uterus exist, cauteries should no longer be applied with that degree of severity which is indicated when their curative agency is looked for.

The *mode of proceeding in dealing with intra-uterine cancer* is, 1st, to dilate the cervix with one or more laminaria-tents; 2ndly, having ascertained the form which the disease assumes, we proceed, if there are projecting masses more or less polypoid, to shave them off by the wire-écraseur, and to cauterize the surface afterwards with the actual cautery or nitric acid, or if there are small excrescences to scrape them off with Sims' or Récamier's curette, applying nitric acid afterwards.

The actual cautery may be applied by an iron or copper olive-cautery through the cervix, held well open by tenacula. But this is difficult to accomplish without burning the cervical canal in transit. The porcelain olive of the galvanic apparatus is decidedly superior. It can be introduced whilst cold to the very spot we want to cauterize; and the heat being turned on and off at will, its action can be defined with absolute precision.

To apply nitric acid, we insert a tube like Atthill's into the cervix to serve as a sheath or canula, through which a rod carrying cotton-wool steeped in the acid is passed. I have devised a funnel-shaped tube (Fig. 175), mounted on a stem for this purpose, which I find more convenient than Atthill's. I use a Sims' duck-bill speculum in the ordinary way; then the cervical tube is passed into its place, and the stem and handle keep back the anterior wall of the vagina, affording ready access to the uterus. The instrument has also the advantage of being easily withdrawn. The nitric acid swab should be pressed firmly down upon the inner surface of the uterus, so as to ensure decided action upon the morbid surface. It is often more convenient to apply nitric acid to the uterine cavity by aid of the catheter (Fig. 52, p. 164). In this way the acid is carried through the cervix without touching this part, and is squeezed out into the uterine cavity. The action of the acid is superficial. There is no reason to apprehend danger from its use.

The *palliative treatment of cancer* consists in controlling pain, hæmorrhage, and offensive discharges; in mitigating the distress produced by the extension of the disease to neighbouring organs, especially the bladder and rectum; and in meeting, as best we may, the constitutional deterioration.

Pain becomes especially exhaustive in the latter stages. We must have recourse to opium in its varied forms, in pill, draught, suppository, vaginal pessary, subcutaneous injection; to conium, belladonna, Indian hemp, chloral, and the other known narcotics and sedatives. The local application of sedatives has been extensively tried by Simpson. He played streams of carbonic acid, and of chloroform vapour upon the diseased parts. In some cases benefit

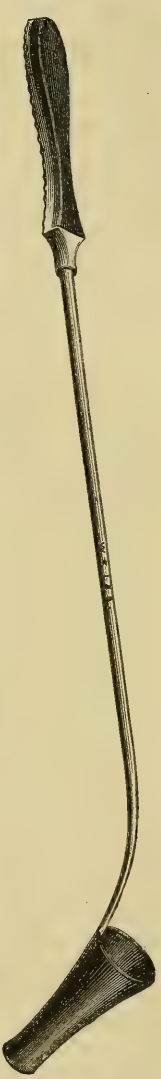

Fig. 175.
Intra-uterine speculum (half-size).
(R. B.)

resulted, but the difficulty is great in sustaining the action of these remedies. The effect is but temporary. The application of cold by ice or freezing mixtures was at one time urged by Dr. James Arnott, in the belief that it was even curative by killing the diseased tissue. I have tried the application of cold by means of the ether-spray in several cases. It produced such suffering that I have abandoned it.

The necessity of restraining hæmorrhage when profuse becomes urgent. Patients, however, often affirm that they have felt material relief after an attack. No doubt local congestion is relieved by it, and the habit of free bleeding is commonly attended by a habit or capacity for making blood with rapidity. But we never know that bleeding will not exceed the recuperative capacity of the system, and in the long run repeated losses break down the constitutional powers. Bleeding, therefore, must, as a rule, be stopped. Three principles call for attention. The first is to produce such a change in the condition of the diseased part as will lessen its morbid activity and the determination of blood to it. The means of accomplishing this are included in the curative treatment: removal of the diseased mass wholly or in part, by cautery, by knife or scraper, and the securing a new surface.

The second principle is that of simple hæmostasis. This is carried out by the direct application of styptics. Amongst these the best are chromic acid, nitric acid, perchloride and persulphate of iron, and iodine. To apply these effectually, the speculum must be used. Great care is necessary in passing this instrument, as the fragility of the morbid tissues is so great that it is often difficult to introduce it without causing fresh bleeding. If chromic acid be used, the crystals just moistened with water is the best form. A small pledget of lint or cotton wool steeped in this is then pressed gently on the bleeding surface. It turns the part bright yellow, chars it, and generally stops the bleeding effectually. The superfluous acid can be washed out by a Higginson's syringe. Nitric acid fuming should be used in a similar manner. The iron-styptics should also be used very strong.

The third principle is that of regulating and moderating vascular excitement. This is promoted by salines, digitalis, bromides, hamamelys, perhaps ergot. It is important to obviate fæcal accumulations in the lower bowel; and scarcely less important to keep the glandular system, including the skin, in good working order.

But since an attack of hæmorrhage may come on at any unforeseen time, and under circumstances which preclude skilled assistance, the patient or her attendants must be armed with appliances and instructions to meet the emergency. As a temporary expedient, a lump of ice may be passed into the vagina.

But a more certain way is first lightly to syringe out the vagina with cold water, then to introduce by means of my plug-speculum (see p. 166) a pledget of cotton-wool soaked in the strong solution of perchloride of iron. As a rule, the plug should not be left in more than an hour. Its retention is often accused by patients of causing heat, distress, and of provoking return of bleeding.

The control of the offensive watery discharge includes the use of *deodorants or disinfectants.* Cleanliness is the first thing to secure. Syringing with Condy's solution is of service. But since the frequent use of instruments is attended with more than inconvenience, injection of more efficient disinfectants should be resorted to. The agent which has given me the most satisfaction on the whole is acetate of lead. The action of this is hæmostatic, deodorant, and sedative. It has often struck me that it has a beneficial effect upon the diseased surface. It may be used in the proportion of one drachm to a pint of water. An excellent disinfectant is a weak solution of bromine made of five fluid ounces of the British Pharmacopœia solution diluted with fifteen ounces of water. One objection to its use, inseparable however from its virtues, is that it has a pungent odour. A weak solution of carbolic acid is often useful. I have found kreasote singularly efficacious, and in a ward where a cancerous patient is so often a source of annoyance to other patients, the nurses have assured me that the odour of kreasote so used was not only not complained of, but was even liked. Chlorozone is an excellent disinfectant. Alum is one of the best deodorants. Its property of coagulating albuminous matter makes it extremely useful in these cases. Chloride of zinc has also its advantages; but the lead and alum, being powerful astringents, are generally to be preferred. I have tried the much-vaunted chloralum without discovering that it is superior to the agents described above. Dr. Burow, of Königsberg, speaks highly of the effect of the chlorate of potash upon ulcerating carcinoma. The surface is sprinkled once a day with the salt.

The steady use of styptics and disinfectants is often attended by good effect in lessening constitutional infection. By removing the foul excretions as soon as formed, and by altering the excreting surface, absorption of noxious material is prevented. In this way the agents we have been describing exert an important secondary effect.

The *constitutional* treatment or management of cancer patients is a matter of great importance. We may with advantage begin by eliminating the lædentia. Foremost amongst these is excess of alcohol. Stimulants carried beyond the most moderate extent are decidedly injurious. By exciting the circulation, they increase the determination of blood to the diseased organ, and promote hæmorrhage, if not also the advance of the disease.

The diet of patients suffering from cancer is a matter of great moment. Mr. de Morgan called attention to a fact, the truth of which cannot be doubted, namely, that the disease occurs for the most part in persons strong and well-nourished and remarkable for general good health. This shows that the disease does not arise from want of tone or defect of nutrition. Hence it would appear very doubtful whether it is wise to recommend the patient, as is often done, "to keep up well," to take plenty of nourishment, to use stimulants, with the view of counteracting this supposed poisoned state of system. If an undue amount of nourishment is taken, a fair share of it will go to the increase of the disease, and stimulants which are taken to the extent of quickening the circulation will at the same time increase that of the tumour and accelerate its growth. The restriction to a light milk and farinaceous diet has been recommended from early times. A distinguished physician told Mr. de Morgan that his wife had cancer of the uterus; he kept her for a long time on the sparest vegetable diet, just enough to sustain life; the disease disappeared. Years afterwards the cancer reappeared and destroyed her, circumstances having prevented her from observing the same *régime* as before.

Rest is commonly necessary. But if it be found that moderate exercise, as in driving, does not increase pain or hæmorrhage, it is desirable to take it. Physiological rest is the most important. The wise physician will exercise great reserve in enforcing sexual abstinence in the great majority of cases of uterine disease. But in the case of cancer his injunction should be decided. The direct and remote evils produced by intercourse are so great that regard for the patient's safety leaves no doubt as to the necessity of abstinence. Attacks of hæmorrhage, even fatal, have been traced to imprudence in this respect. That the activity of the disease is promoted by it there can be no doubt. And in the not improbable event of pregnancy, the risk encountered is vital.

The internal use of remedies is greatly limited to the fulfilment of special accidental indications. The bowels commonly demand attention. Constipation is a troublesome complication. It must be met by suitable aperients, and by enemata.

Bromine and iodine internally were greatly relied upon by Boinet. Iron seems indicated by the degraded state of the blood. But it is not often well borne. Salines I have found of great service. Bismuth, strychnine, hydrocyanic acid will occasionally be required to allay irritability of stomach. I have seen in many cases remarkable benefit from cod-liver oil.

CHAPTER XXVIII.

THE DISEASES OF THE VAGINA.

COLPITIS (VAGINITIS): SIMPLE, INFECTIOUS, ACUTE, CHRONIC; DISPLACEMENTS; WOUNDS; DILATATION; ATROPHY; CONTRACTION; SYPHILITIC, TUBERCULOUS, CANCEROUS ULCERATIONS; SLOUGHING; CICATRICES; LACERATIONS OF THE CERVIX UTERI; VESICO-VAGINAL AND RECTO-VAGINAL FISTULÆ; RUPTURED PERINEUM; NEW FORMATIONS: FIBROUS TUMOURS; SARCOMATA; CYSTIC TUMOURS; HÆMATOMA; CALCULI.

SOME of the abnormal conditions of the vagina have been described in preceding chapters (see Atresia, Leucorrhœa, &c). It will here be necessary to describe those which have received insufficient attention.

Vaginitis or Colpitis.

Acute vaginitis sometimes follows labour, the result apparently of contusion of structures in a state of exalted vascularity. In these cases exfoliation or desquamation of the epithelial layer is very active, so that the bared surface presents a raw velvety-red angry appearance. Even during pregnancy the intense vascularity of the vagina disposes to free shedding of epithelium, which often collects about the summit of the vagina in the form of a creamy pasma, or in shreds or pellicles.

Acute vaginitis may also occur from exposure to cold during a menstrual period, from injury, from direct infection, from the introduction of foreign substances, from the use of irritating powders or injections. In children it may be caused by ascarides, by neglect of cleanliness, by improper manipulation. I have referred to the association of vaginitis with the eruptive fevers. Scarlatina, especially, affects the genito-urinary mucous tract, and thus I have known intense vaginitis produced. The first case of the kind I saw was that of a young woman in

Chomel's wards at the Hôtel-Dieu, in 1840. In these cases there is prolific generation and casting off of epithelium, attended and followed by a severe form of leucorrhœa.

Leucorrhœa in children is not very uncommon, and when observed is sometimes the source of most distressing suspicions. It is therefore eminently necessary to call attention to the fact that children are liable to non-virulent discharges, depending upon accidental causes. The symptoms of vaginitis and vulvitis in children are: in the acute stage, the patient complains at the onset of itching or burning at the vulva. This is increased during micturition. A whitish opaque moisture is formed over the surface of the labia, and these are often redder than in the normal state. The patient has often a difficulty in walking, the friction increasing the irritation of the inflamed surfaces. In the chronic state the discharge is a serous or lactescent moisture; there is little pain in the vulva, but sometimes a dull pain above the pubes, spreading to the groins and inner part of the thighs.

This form of vulvo-vaginitis has been noticed at the time of dentition, from indigestion, from exposure to heat and fatigue—as from dancing—from constitutional diathesis, especially the strumous, resembling in this respect the tumid chronic inflammation of the conjunctiva and nares.

The treatment consists in putting the child in a warm bath every two or three days, applying demulcent lotions, as poppy-head, mallow, or linseed decoctions, or weak acetate of lead, and in regulating the secretions; in the use of iron, iodine, and cod-liver oil.

The most common cause of acute or sub-acute colpitis is *gonorrhœal infection*. In this case the mucous membrane, especially at the fundus of the vagina, is intensely red. There is copious muco-purulent secretion of a yellowish or greenish tint, sometimes tinged with blood. This is found chiefly at the fundus of the vagina, surrounding and bathing the vaginal-portion of the uterus, which is involved in the like condition.

An experienced practitioner will generally recognize the specific character of this inflammation; but it is easy to fall into error in diagnosis. The moral and social complications are at times so intricate, and the reasons for dissimulation on the part of patients are so strong and various, that even in the presence of the most convincing clinical proof, it will rarely be wise to commit ourselves to a plain expression of opinion. The subjects themselves may, moreover, be perfectly innocent and unconscious of the nature of the affection. And we must not always expect to be dealt with candidly. What we say will perhaps be misinterpreted or misrepresented. A circumspect reticence therefore becomes a virtue and a duty in the physician.

Gonorrhœal colpitis is very apt to invade the cervical canal, and thence to pass into the chronic stage, a condition analogous to gleet in the male. It may spread upwards to the uterus and Fallopian tubes, and thus lay the foundation of an obstinate chronic metritis, and even give rise to peritonitis.

It is also apt to spread along the urethra. This is more frequent, says Guérin, than is commonly thought. Occasionally the orifice of the urethra is inflamed, swollen, dotted with red points or pimples, corresponding to the openings of the lacunæ, and in such cases recognition of urethritis is easy; but when the disease is internal, and when no mucus or pus appears externally, detection becomes more difficult. When any doubt exists, the patient should be prevented from emptying the bladder for several hours; the finger should then be introduced into the vagina, and drawn along the anterior wall, so as to press out any purulent matter collected within the urethra.

Chronic catarrhal inflammation commonly occurs after repeated acute inflammations, as from menstrual suppression, gonorrhœal infection, childbed, in chlorotic or scrofulous persons, from uterine catarrh, the irritation of uterine polypi, or hypertrophied vaginal-portion, dislocations of the uterus, the formation of morbid growths, and ulcerative processes. It is also frequent, and often at first acute in character, in newly-married women from excess or awkwardness in intercourse.

Vaginal catarrh is of importance from its liability to spread to the uterus, and thence to the tubes; and it disposes to intussusception and prolapsus of the vagina.

Inflammation of the sub-mucous fibrous coat of the vagina is not common apart from traumatic causes. Kiwisch has called attention to the occurrence of abscesses in this tissue during pregnancy.

But there is a chronic form, not very uncommon, the result in most of the cases which I have seen of imperfect or irritating intercourse. It is marked by thickening of the walls of the vagina, the formation of abscesses, and a degree, sometimes considerable, of atresia of the canal.

Symptoms and Diagnosis.—In the acute stage there is pain, often severe, characterized as "burning" in the part. Dyspareunia is almost necessarily present. Some febrile excitement attends. Unlike metritis, it is very rarely complicated with peritonitis. Hence the local and constitutional symptoms are less severe. Dysuria generally attends the gonorrhœal form. In this form also there is leucorrhœa of the character described. But absolute diagnosis can only be made out by aid of the speculum, when we can take note of the vivid red mucous membrane, and see the discharge *in sitû.*

In the chronic and non-specific forms, pain is not so much complained of. I must refer to the chapter on "Leucorrhœa" for further information on this subject. When the disease has involved the cervical canal, vaginal injections are inefficient. Topical applications inside the cervix are essential. One form of pain, "Vaginismus," has been described in connexion with "Dyspareunia."

The *treatment* of colpitis consists greatly in observing rest and cleanliness. To aid in securing rest, an essential condition often is to keep the inflamed walls of the vagina apart. This is accomplished by wearing Sims' or my vaginal-rest for several hours during the day; by using a plug of cotton-wool steeped in tannin and glycerine, changing it two or three times a day, or by simple rest in the recumbent posture. Douches of tepid water or poppy-head decoction are often of signal service. In the more acute stages injections of lead in proportion of one drachm to a pint of water are best borne; later, sulphate of zinc, chloride of zinc, alum, tannin are more serviceable. The gonorrhœal inflammations may be treated exactly on the same principles as the similar affection in the male. The quickest method of cure is undoubtedly to touch the diseased surface lightly every other day with solid nitrate of silver, solid or in solution, or with tincture of iodine.

Diphtheritic inflammation most frequently occurs in childbed, and especially in lying-in hospitals; but I have seen an example in home practice. There is a form of vaginitis in which the mucous membrane is covered by pellicles, or flakes, white, very brittle, to which the name diphtheritis is sometimes given. At best this should be called pseudo-diphtheria. It is not usually attended by febrile symptoms. The vaginitis is not very acute, it is strictly limited to the mucous membrane, and the pellicle consists almost entirely of agglomerated epithelium-scales. The formation of the pellicle seems simply due to the preponderance of the scales over the mucous plasma. If the mucous plasma were more abundant, the discharge would be called leucorrhœa.

Displacements of the Vagina.—Displacements of the vagina can hardly arise without the preliminary condition of relaxation, or of displacement of the uterus. Whether prolapsus of the uterus be the cause or the effect of prolapsus of the vagina is a question already discussed. No doubt, prolapsus of the vagina is commonly associated with prolapsus of the uterus, but I believe prolapse of the vagina may exist independently. There is a preparation in St. George's Museum (No. xiv. 106) which seems to show that vaginal rectocele may exist without prolapse of the uterus.

Hernias consist in an inversion of the anterior wall of the vagina with the bladder—*cystocele vaginalis;* or in inversion of the posterior wall from the lower end of the rectum—*rectocele vaginalis;* or in a *hernia vaginalis posterior—enterocele vaginalis.* This last form consists in dilatation of Douglas's pouch to a hernial sac, so that the peritoneum is carried deeply down behind the wall of the vagina to the perineum. The intestinal folds contained in it drag upon the vagina, then tilt it from behind, pressing from above downwards more and more of its circumference, according to the degree to which the uterus follows the traction and descends. The prolapsus of the vagina thus produced gradually proceeds to a complete inversion, which contains in its cavity the prolapsed uterus, which in consequence of this traction undergoes very frequently a considerable or even monstrous elongation of its cervix. Commonly the rectum is also protruded to a prolapsus by the hernia. In rare cases, in consequence of the mass of intestinal convolutions accumulating in the hernial sac between the uterus and the inverted vagina, laceration of the posterior wall of the vagina has occurred with a fatal issue.

The tendency to rectocele is found in the natural bulging of the pouch or expansion of the rectum just above the sphincter ani. This is always seen in operations for restoration of the perineum. To dissect a flap of mucous membrane from this pouch constitutes one of the niceties of the operation. When this pouch loses the support of the perineum, it becomes larger. It is also increased to rectocele under fæcal accumulation, retention, and straining at stool.

The treatment of vaginal prolapse and hernia in most cases merges in that which is indicated for prolapsus of the uterus. In some few cases a Hodge or stem-pessary may be useful. Astringent injections are almost always serviceable. But when the prolapse is great, so that folds of vagina protrude through the vulva, becoming liable to chafing and inflammation, surgical treatment is necessary to remove the redundant portion. A piece of the mucous membrane of size and form indicated by the conditions of the case must be dissected off, and the edges brought together, so as to contract the canal. It will commonly be necessary to combine this proceeding with the perineal operation.

The vagina is liable to *wounds* from the introduction of foreign bodies, from accidents, and from surgical operations.

The most frequent cause of the lesions that come before the surgeon is severe labour. The vagina is liable to undergo laceration, contusions, leading to partial necrosis, or sloughs. Hence result cicatrices which may lead to occlusion of the vagina, or fistulous opening into the bladder or rectum. *Vesico-vaginal fistula* may be produced by the mere pressure of the head long continued, jamming the bladder against the pubes.

In precipitate labour, or in protracted labour in primiparæ where the vulva is rigid, the perineum is apt to undergo laceration backwards to the anus.

The anterior commissure also, as I pointed out many years ago (*see Tyler-Smith's Obstetric Medicine*), is liable to rupture, whence severe hæmorrhage may arise.

There is a singular preparation in the Museum of St. George's Hospital (Series xiv. 108). It is a case of laceration of the vagina from coition. There is a rent passing along the upper two inches of the vagina, dividing the mucous membrane and the adjoining fibres of the muscular coat. The rent deepens as it ascends, and on a level with the os uteri has broken through into the peritoneal cavity. The hole in the peritoneum is not quite large enough to admit the little finger. The subject was an old woman.

The most trivial *wounds* of the vagina are sometimes followed by profuse bleeding. This is especially the case during pregnancy. But at any time the slightest nick, puncture, or incision may give rise to profuse bleeding if the patient assume the erect posture and be exposed to any exertion. A surgeon snipped off a very small warty excrescence from the vagina just inside the vulva. The woman nearly bled to death. Plugging and the application of styptics failed to arrest it. I passed a curved needle armed with a suture so as to get quite under the little wound. The suture drawn tight effectually controlled the bleeding. This is the surest plan to adopt. A short sewing needle held in a forceps might on emergency answer. But in some cases, steady pressure with a pad of lint steeped in perchloride of iron or other styptic may be enough, absolute rest in recumbent posture being understood.

Professor E. Martin describes (*Monats. f. Geburstk*, 1869) a *temporary dilatation of the fundus*, not the result of stretching or distension, but which is caused by a pathological action of the neighbouring ligaments; that is, the pubo-vesico-uterine, and the sacro-uterine, the muscular bundles of which contract. The examining finger finds the roof of the vagina so wide that it seems as if its walls were applied close to the sides of the pelvis. This condition is found when there is hæmorrhage with uterine colic, and in secondary puerperal hæmorrhage. I have commonly observed it during abortion. It seems to be associated with expulsive effort. In such cases the os uteri is open, and the roof of the vagina seems higher than usual. Under the use of means to arrest the bleeding this dilatation disappears completely in twenty-four hours. I have observed a more permanent dilatation of the fundus vaginæ forming a large cavity in some cases of perimetritis.

There is a form of *atrophic contraction of the vagina* which takes place in advancing age. The walls lose elasticity, the canal becomes smaller, sometimes funnel-shaped or conical, the apex being at the roof, where the remains of the atrophied cervix uteri may be felt. Some cases of this kind are not easy to distinguish from the strictures which ensue occasionally upon cancer. This atrophic contraction is most common in women who have abandoned the habit of sexual intercourse. It explains the rupture in the specimen in St. George's Museum just alluded to (Series xiv. 108). In some cases the vagina is almost obliterated.

The vagina may be the seat of various *ulcerative processes.*

Excoriations occur from catarrhal suppuration or the chafing of fibroid polypus, of pessaries, &c.

Syphilitic sores may occur in any portion of the vaginal canal, but the most frequent locality is the fold or duplicature at the fundus, into which the vaginal portion of the cervix uteri is inserted. This is commonly attended by colpitis. To the touch an excavated syphilitic sore may at first impose upon the surgeon for the os uteri.

The *tuberculous and cancerous ulcerations* generally begin on the vaginal-portion, and spread to the roof of the vagina. The latter especially are unhappily frequent, and often lead to destruction of the walls between bladder and rectum, establishing cloacæ or fistulæ.

The vagina is sometimes ulcerated from without, through the burrowing of sub-peritoneal abscesses which make their way into the vagina.

Sloughing of the vagina occurs as the result of the bruising and pressure encountered during protracted labour, from diphtheria, from necrosis in severe fevers, from perivaginal hæmatoceles and abscesses, from necrosis resulting from the pressure of fibroid tumours so large as to become impacted, or from the impaction of a retroverted gravid uterus.

The healing of vaginal sloughs by granulation frequently results in the formation of cicatrices. Those cicatrices which lead to atresia or stenosis of the canal have been described, in their pathological and therapeutical bearing, under "Dysmenorrhœa from Retention." But cicatrices, in the form of bands or falciform projections into the vagina, not extensive enough to close the canal, are not uncommon. They produce distress of a different kind. They may form crescentic or falciform bands seizing the os uteri by one horn and the vaginal wall by the other. This, contracting, may half shut off the os uteri from the canal of the vagina below, forming a pouch or sac above. It also not uncommonly pulls the cervix uteri to one side, or forwards or backwards, producing deviation of the uterus. But cicatrices are not uncommon which do not thus project as folds. They are felt as dense cords when the vaginal roof is stretched by the finger. They contract the fundal space, interfere with the mobility of the uterus, and maintaining a constant irritation, cause leucorrhœa, neuralgia, dyspareunia, and other distress.

I have seen these cicatrices follow labour, instrumental and not instrumental, also cauterization of the os uteri by potassa cum calce, and even by nitrate of silver incautiously applied. They have also followed the use of too concentrated chromic acid and perchloride of iron.

The *treatment* consists in dividing the cicatrices so as to allow the vaginal wall to resume its natural form. When the cicatrix extends up the vaginal-portion this part should be set free, by dividing the horn which seizes and binds it to the vaginal wall. The first step is to dissect off the adventitious membrane from the vaginal-portion, so as to restore this part to its normal condition; and then several nicks should be made at different points of the crescentic edge, as deeply as is felt to be safe, taking great care of course not to go through the vaginal wall. This operation is best done without the speculum. The cicatrix is made tense by the forefinger of the left hand, and then the edge of a Simpson's metrotome is turned upon it. When thus nicked these cicatrices have a tendency to disappear. But it is likely that the incisions will have to be repeated from time to time before they are overcome. Sometimes the bleeding attending this operation is very profuse; and it is, I think, always prudent to plug the vagina firmly with pledgets of lint soaked in olive oil and carbolic acid. The operation should in every case, however slight it may seem to be, be performed on the patient in bed. Absolute rest in the recumbent posture should be rigidly enforced for four or five days afterwards. If these precautions are adopted there will probably be no bleeding of importance; if neglected, profuse, even fatal hæmorrhage

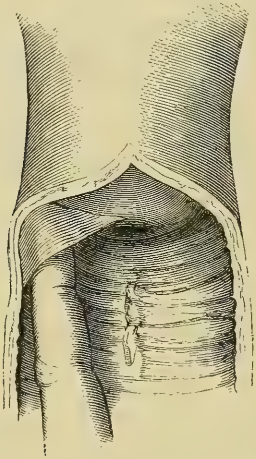

FIG. 176.

CICATRICIAL BAND BINDING OS UTERI TO ROOF OF VAGINA (R. B.).

may result. Under no consideration should the operation be performed in the out-patient's room of a hospital, or in the physician's consulting-room.

A day or two after the operation it is desirable to apply a Hodge-pessary, so shaped that it will keep the roof of the vagina on the stretch, so as to obviate the disposition to contract, which the scar frequently manifests. I have seen extensive cicatrices gradually disappear under this continual stretching. In one case, that of a lady who had suffered extensive sloughing after labour, the vagina was very contracted. But in a year the canal was so nearly restored to its natural state that she subsequently bore a child at term without artificial aid. Fig. 176 represents a not uncommon form of utero-vaginal cicatricial band. Raised on the finger it is made tense for division.

Lacerations of the Cervix Uteri.—Emmet calls attention to the frequency of lacerations of the cervix, and to the serious distress they entail (*Amer. Journ. of Obst.*, 1874). Theyare most frequent, he says, in the median line, and more frequent in the anterior than in the posterior lip. If in the median line and confined to the cervix, they generally heal rapidly. But when the lacerations extend through the vesico-vaginal septum a fistula may result; and this part of the rent may not heal. Lacerations through the posterior lip also heal readily ; but sometimes when they extend far back inflammation may arise, and cause an intractable form of retroversion. A cicatricial band is left which must be removed before relief is obtained. But it is the lateral lacerations with which we are chiefly concerned in practice. Whenever the rent has extended to the vaginal junction or beyond, there will exist a tendency for the tissues to roll out from within the cervical canal. Hypertrophy and cystic degeneration of the lips ensue ; involution is arrested ; partial obliquity of the uterus is produced. On getting about the woman is soon the subject of great distress ; leucorrhœa, menorrhagia, dysmenorrhœa, difficulty in walking impel her to consult her physician. The attendant abrasion, glandular inflammation, hypertrophy, leucorrhœa are readily recognized ; and many such cases are treated for "ulceration" ineffectually for months. Emmet has successfully treated more than two hundred such cases, by paring the edges of the fissure and uniting them by silver sutures, so restoring the cervix to its normal shape. I can confirm the accuracy of Emmet's views. I have performed his operation with satisfactory results.

Fistulæ of the genital organs may be divided into four classes:—1. Between the bladder or urethra and vagina ; the most common. 2. Between bladder and uterus ; rare. 3. Between rectum and vagina ; not very rare. 4. Between rectum and uterus ; very rare. To these might be added uterine fistulæ, communicating with an abscess in the pelvis ;

and fistulæ opening into the vagina from perimetric abscesses or retro-uterine hæmatocele.

The most common seat of the vesico-vaginal fistula is near or half an inch below the anterior edge of the os uteri.

Symptoms.—The urine may either be retained for a few days after labour, or it may flow by the urethra with more or less pain. But at the end of a week or so the patient becomes conscious that her water runs away by the vagina more or less continuously; in fact, that she cannot hold it; that she is, as the expression goes, "always wet." Excoriation of the external genitals is a frequent consequence. Phosphates collect in the vagina and cause further irritation. Sometimes, in the recumbent posture, the vulvar sphincter being unimpaired, the vagina forms a pouch, which will retain a considerable quantity of urine, acting the part of a subsidiary bladder. But on rising or exertion this accumulation is discharged, and the dribbling goes on. The incontinence begins from the falling of the slough. This leaves a hole in the septum between bladder and vagina, the edges of which gradually cicatrize. In this process the hole contracts, often so much that there may be great difficulty in finding it. But a hole that will barely admit a fine probe is big enough to drain off the urine as fast as it is secreted. The hole may be big enough to admit the tip of the finger. The greater part of the urethra may be destroyed. In some cases the lower segment of the uterus is lost, as well as the base of the bladder. The anterior lip of the os uteri is not uncommonly lost. In one case I could find no cervix. There was nothing in the roof of the vagina to be found, but a fistulous opening admitting the tip of the finger. This was cured in two operations; and the patient menstruated through the bladder.

The *diagnosis* is established by sight and by touch. Whenever incontinence of urine has come on after labour, examination by finger and sound, and by speculum is indicated. The patient in semi-prone posture, the sound is passed into the bladder, and the forefinger in the vagina carried to the os uteri, and then brought down along the course of the urethra, feeling for the sound through the fistula, if one exists. Generally the puckered cicatrix of the fistula is felt, and guides to the opening. Through this opening is felt projecting a velvety nipple-like mass, the mucous membrane of the bladder. Through this the point of the sound is sometimes carried from the bladder. This evidence, complete in itself, may be extended by the use of Sims' speculum. The perineum being lifted away the aperture may usually be seen; the mucous membrane of the bladder bulging like a cherry or a raspberry, and urine oozing or dribbling through it. The point of the sound may be seen in the fundus of the vagina. When the opening is very small or overlapped by mucous membrane, it may be made out by injecting milk through the bladder. This will be visible when the source of clear urine might not be detected.

In the case of recto-vaginal fistula, the opening may have become so contracted that escape of fæces into the vagina is only occasional, that is, when the stools happen to be liquid. It may require some pains to detect the opening. It usually lies rather low down, at the point where the floor of the perineum begins to incline forward from the hollow of the sacrum. It may be made evident by finger and sound.

The etiology of fistulæ properly belongs to obstetrics. It is, however, important to state here that fistulæ are caused in two distinct ways. 1. By *slough,* the result of long pressure between the child's head and the pelvic bones, or between an edge of the forceps and the pelvis. The latter is comparatively rare; the timely and skilful use of the forceps is indeed the best way to obviate the danger of sloughing from pressure of the child's head. 2. By *laceration,* extending from the edge of the os uteri into the bladder. This, according to Emmet, whose experience is unsurpassed, is frequent. The laceration of the os uteri may heal, and yet the opening into the bladder may remain. In these cases there is no loss of tissue.

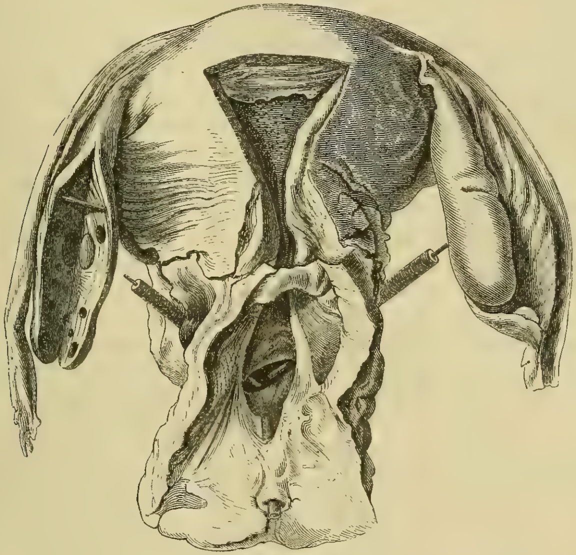

FIG. 177.—(From a preparation in St. Thomas's Hospital.)

SHOWING THE RELATIONS OF THE URETERS TO VESICO-VAGINAL FISTULA (R. B.).

The specimen is seen from the posterior aspect. The cavity of the uterus is laid open. Bougies are passed into the ureters, the ends project into the bladder, and are seen at the orifice of the fistula. A bougie in urethra meets them.

Any constitutional taint should be carefully treated.

Before operating, the fitness of the parts should be tested. The edges of the fistula should be seized at opposite points with a tenaculum, and the degree of tension estimated by approximation in different directions. Wherever a contraction-band is thus brought into prominence, it should be divided. Very free hæmorrhage may follow this proceeding. It will be controlled by rest and plugging.

The *time* selected for the operation should be a week after the cessation of menstruation. If done later the operation is very apt to precipitate menstruation; and this process may mar success. No operation should be attempted during pregnancy. The bowels should be relieved by enema the day before operating.

Preparatory Steps.—Emmet insists (*Vesico-vaginal Fistula, &c.*, New York, 1868) strongly upon the necessity of carefully preparing the parts before attempting to close the fistula. All phosphatic deposit must be carefully removed by a soft sponge and the raw surface touched with weak solution of nitrate of silver (or iodine). Warm sitz baths and irrigating the vagina with warm water render great service. After bathing, the external parts should be protected from urinary irritation by anointing with cerate. The greatest care should be taken to lessen the contact of urine with the parts. A healthy condition, fitted for operation, is not reached until the hypertrophied and indurated edges of the fistula have attained a natural density and colour. This, says Emmet, is the secret of success; without it the most skilfully performed operation is almost certain to fail. No pains to remove cicatrices can be superfluous. Cicatricial contractions may pull upon the edges of the fistula and frustrate union. Cicatrices are generally best made out by the touch. When thus put upon the stretch they are felt as tight bands. They may be divided or nicked in several places by scissors or knife. And to promote relaxation they should be kept stretched by wearing a vaginal rest of glass or vulcanite. I have found a Hodge pessary answer well. This nicking and stretching may have to be repeated several times before perfect smoothness and mobility of the tissues are attained.

The Operation.—The posture of the patient may be either the semi-prone, the knee-elbow, or the lithotomy. The American operators mostly prefer the semi-prone. If the semi-prone posture is adopted, an assistant holds back the perineum with Sims' duck-bill speculum. If the lithotomy-posture is adopted, the ankles and wrists may be secured by Pritchard's anklets. whilst assistants on either side hold open the vulva by fingers or retractors, and the perineum is depressed by the duck-bill speculum. In this way sufficient access to the wound may generally be attained. But Simon usually dragged the parts near to the vulva by hooks and strings attached to the mucous membrane of the vagina and to the os uteri.

Operators differ as to the mode of performance; but all aim at the same end—a clean paring of the margin of the fistula and accurate adaptation of the fresh wound. Emmet prefers scissors, of which several pairs, expressly curved, must be at hand. The edge of the fistula is seized with a very fine tenaculum at the most depending part, and then the edge is removed in a continuous strip all round. The paring should be extended as near the mucous membrane of the bladder as possible, without actually wounding it. To pass the sutures, the tenaculum is again introduced, the point towards the fistula at a convenient distance from its vaginal edge; then by a rotation of the hand in the opposite direction, the bladder end of the fistula will be turned out. The needle is then introduced behind the tenaculum, bringing out its point just at the bladder surface, and while still grasping it with the forceps, the tenaculum is withdrawn, and its hook is passed over the point of the needle to make counter-pressure whilst the needle is passing through. The needle seized and drawn through, the opposite edge of the wound is seized by the tenaculum in like manner, and the needle is carried on, introduced at a corresponding point near the bladder-surface. If a transverse wound is made Aveling's revolving needle answers well.

Four to five sutures to the inch should be used, and one or more should be passed at each extremity beyond the fistula.

Sometimes a good flap for removing by knife can be seized by a broad toothed forceps, or Hilliard's three or four-pronged fork may serve.

The simple interrupted suture is much to be preferred. The wire may be secured by simple twisting, or by Aveling's coil-clamp and shot.

It was long thought that the recent success attained was mainly due to the use of silver wire sutures, upon which the revivers of the operation, Sims, Bozeman, and others have so much insisted. But the antecedent experience of Charles Brooke has been strangely overlooked in the history of this operation. More than thirty years ago this surgeon cured fistulæ by silk sutures secured by his beads. He was also, as I testify by personal observation, eminently successful in curing perineal lacerations by his bead sutures. Indeed I am not sure that any considerable improvement has been made upon his perineal operation.

The paring the edge of the fistula may be done either in the transverse or in the long axis of the vagina. The choice is determined greatly by the direction of the longest diameter of the fistula. Where the opening is circular, the transverse paring is to be preferred, because the mobility of the walls of the bladder is greater in the longitudinal direction than from the sides. When the opening is very large and irregular in shape, the paring and line of union will be also irregular, perhaps oblique, or even **Y** shaped or **T** shaped.

The *after treatment* consists mainly in rest. As to emptying the bladder the different practice of surgeons seems to show that the method to be selected is not of essential importance. Emmet and Bozeman retain a catheter in the bladder. Simon thought this unnecessary. The catheter may be passed every eight hours, or the patient may be permitted to empty the bladder in the usual way.

Accidents that may occur during and after the operation.—One is the presence of the ends of *the ureters at the fistulous opening,* so that they might be included in the stitches. It is to illustrate this complication that I have introduced Fig. 177. The ureters may sometimes be seen yielding urine *stillatim.* To avoid stitching up these orifices, we may so pass the needles as to run between the two mucous membranes, or as Simon did in one case, we may slit up the ureter for half-an-inch inside the bladder, so as to secure an opening higher up out of the way. More frequently the fistulous opening being smaller, the orifices of the ureters are not visible; still they are liable to be taken up by the stitches. Generally they are avoided, because they are placed near the extremities of the pared wound where the needles penetrate less deeply; if one lip only of the orifices is included, no obstruction to the flow of urine occurs; and even if the whole orifice be taken up, the urine will commonly find a passage along the tract of the suture, and thus re-establish the orifice. *Primary and secondary hæmorrhages.* In one case in which the vesico-vaginal artery was divided, Simon tied it with silk, and brought the ends of the ligature down through the bladder and urethra, in order to avoid its interference with the healing of the wound. But in two other cases he had equal success by bringing the ligature out into the vagina. He insists that tying the artery, if at all big, is the only security. But oozing is almost always stopped by pressure, cold, and by approximation of the wounded surfaces by the stitching. *Secondary hæmorrhage* may take place either into the vagina or into the bladder. In the first case, if arterial, it may be necessary to undo the stitches and secure the vessel by a ligature. Occasionally a vessel may be cut by the needle in passing the sutures, so that time should always be given for the fresh bleeding to stop before tightening the sutures. Bleeding into the bladder almost necessarily frustrates the closure of the fistula. Alarming symptoms attend. The bladder may be so distended as to reach the umbilicus, and the urethra being perhaps obstructed by clot, there is retention of urine. Severe pain and vesical colic arise. At length the blood and clots may be expelled through the stretched-open wound and through the urethra. To stop the bleeding ice may be applied to the abdomen, and to ease pain morphia-injections may be made. But it may be necessary to re-open the wound and to dilate the urethra to break up the clots and to empty the bladder.

A source of hæmorrhage I have witnessed several times is the unexpected *return of menstruation.* This event is very apt to be provoked by vaginal operations.

Peritonitis may supervene. The peritoneal fold between bladder and anterior uterine wall may come very near the range of the operation, and might in some cases of fistula high up be wounded. But peritonitis is far more likely to happen from extension of irritation from the proximate wound. Absolute rest, opium by mouth, or morphia-injections are the best means of meeting it.

Incontinence of urine may persist after the healing of fistula. This may be due to paralysis of the sphincter urethræ, or to injury of the structure of the urethra. As a palliative, an urethral pad may be used. Lacerations, or loss of tissue by sloughing, may be treated by plastic operations. *Retention of urine* may occur either as the immediate effect of the operation, so as to compel resort to the catheter; or later as the result of cicatricial atresia at the seat of the operation, especially when this is at the junction of bladder and urethra. In such a case gradual dilatation must be effected by bougies, or by wearing a catheter. In rare cases, *calculi* have formed in the bladder after operation.

When the cervix uteri is involved in the loss of substance it becomes a question whether the opening can be closed without also closing the os uteri. Sometimes it is necessary to pare the posterior surface of the os uteri, making this one side of the wound which is to be united to the neck of the bladder. In many cases the anterior lip of the os uteri may be pared and made to form one side of the wound. This, united with the neck of the bladder, leaves the os uteri open behind it.

When the fistula is vesico-uterine, it may be impossible to get at the fistula itself. In such a case Jobert closed the os uteri. J. R. Lane, having operated in this manner, found that the uterus enlarged afterwards. This was at first thought to be due to retention of menstrual fluid, and a puncture was made through the place of union. This resulted in an abortion of four months' gestation. It is conjectured that the semen got access along the track of one of the sutures. The patient was cured by repeating the operation.

In those still more severe cases in which the urethra, neck, and floor of the bladder have been destroyed, various attempts more or less successful have been made. The proceedings for relieving these cases of extreme deficiency consist in 1. Closing the lower part of the vagina (Jobert) so that the upper part forms a common receptacle for the secretions of the uterus and the urine; 2. Including the vaginal-portion in the wound so that the os uteri opens into the bladder or urethra; 3. Simon has shown that when there is much deficiency of bladder and urethra, the vaginal-portion may be brought downwards so as to be united in a curved line with the lower margin of the fistula, thus shortening the vagina.

Emmet succeeded in cases where there was too great loss of vaginal tissue in utilizing the mucous membrane of the bladder to supply part of the flap.

In some cases of total loss of the urethra a new urethra has been made by plastic operations. Emmet relates successful cases. I have seen a good restoration made by Chambers at the Chelsea Hospital for Women. Emmet and Simon may be consulted for practical details concerning cases of this nature.

At one time small fistulæ were treated by the actual cautery, in the hope that the resulting slough would be followed by cicatricial contraction and closure. This method cannot be depended upon. The more certain and scientific procedure by suture ought to be adopted at once. But in the recent state whilst the slough is being cast, the opportunity should be taken to promote healthy granulation.

Dr. Goodell relates (*Amer. Journ. of Obst.*, 1874) a case in which he treated a large slough of the vagina which opened the bladder by fuming nitric acid. The opening gradually closed completely, cure being effected.

Vesico-vaginal fistulæ once fairly healed are not very liable to relapse. But Dr. Bourdon (*Arch Gén. de Méd.*, 1872) reports four cases of relapse from Verneuil's *clinique,* all in women who became pregnant.

Recto-vaginal fistulæ are far less frequent than vesico-vaginal. The hinder wall of the vagina is much less exposed to injury than is the anterior wall. Violence is far more likely to rend through the perineum than to cause a fistula. Moreover, the distress arising from rectal fistulæ is less urgent. It may be only when the stools are liquid that any fæcal matter comes through the fistulæ into the vagina. The recto-vaginal septum differs from the vesico-vaginal septum in being much more moveable and yielding, so that less strain comes upon the opening. Some recto-vaginal fistulæ heal spontaneously or under the action of cautery, so that longer time may be given for observation than is justifiable in the case of bladder fistulæ.

Emmet finds that a large proportion of recto-vaginal fistulæ are complicated with vesico-vaginal fistulæ. The vesical lesion, he says, should be treated first. And owing to the greater amount of cicatricial tissue found in the rectal fistulæ, longer preparatory treatment is generally necessary.

The operation for closing these fistulæ from the vaginal aspect is essentially the same as that for vesico-vaginal fistulæ. Simon observes that since the contraction of the cicatrix is very strong in the longitudinal direction, the fistula must be pared in the transverse direction whenever possible, so that the drag of the scar may favour the healing. It is only when the longitudinal diameter of the opening much exceeds the transverse diameter that the paring should be made in the longitudinal direction.

Where the fistula is large and close to the os uteri, it may be necessary to direct the os uteri into the rectum, so that the menstrual flow may take this route. Another mode of proceeding, one especially adapted to fistulæ seated just above the sphincter ani, and to those cases where an opening is left after the operation of perineal restoration, is to slit up the remains of the perineum through the bridge of tissue below the fistula, and then paring the edges and bringing them together, as in the operation for perineorrhaphy, where the sphincter ani has been torn through. Simon has practised yet a third proceeding. In cases where the fistula is seated in the uppermost part of the septum, and the vagina is very constricted, neither of the two preceding operations will succeed. In these Simon operated through the rectum. The sphincter being divided in two places, dilatation of the anus and access to the fistula, although high up, were surprisingly easy. In this way he succeeded, after several failures by the vagina. But in similar cases Emmet succeeded by operating by the vagina, relying mainly upon the sense of touch, when the parts could not be brought into sight.

Lacerations of the Perineum.—These are of varying extent and kind. Some slight rent of the anterior edge or *fourchette* is common in first labours. It entails no distress. Those lacerations which demand surgical treatment may be divided into three classes:—1st. Those in which the rent does not involve the sphincter ani. 2nd. Those in which the whole perineal body is divided, so that the sphincteric control of the anus is lost. 3rd. Those in which the perineum is perforated by the child, a central hole, resulting in a fistula being made, the fourchette in front and the anus behind remaining intact.

In a considerable proportion of cases of the second order spontaneous healing sufficiently complete takes place; and this healing may be greatly promoted by keeping a strip of lint soaked in solution of chloride of lime between the wounded surfaces. Granulation takes place from the fork behind forwards. In other cases where the sphincter is involved, immediate union should be attempted by applying sutures within a few hours after the injury. If the hindmost suture is well applied so as to bring the rent surfaces of the sphincter together, union is generally accomplished. In France immediate union is practised by the use of *"serres-fines,"* or spring-clips, which bind the torn surfaces together. Mann, in a good practical memoir on this subject (*Amer. Journ. of Obstetrics,* 1874-75) adduces satisfactory evidence in support of this practice. Even where nothing is done, a surprising degree of restoration is not seldom accomplished. Granulations meeting from opposite surfaces may unite and consolidate into firm tissue. This is unmistakably seen in those cases of incarceration of pessaries, where rings of strong tissue are formed encircling the pessary.

But when the rent does not heal, serious distress is often felt, even in those cases of minor injury in which the sphincter is intact. The loss of the perineal floor is attended by other inconveniences besides the increased liability to prolapsus.

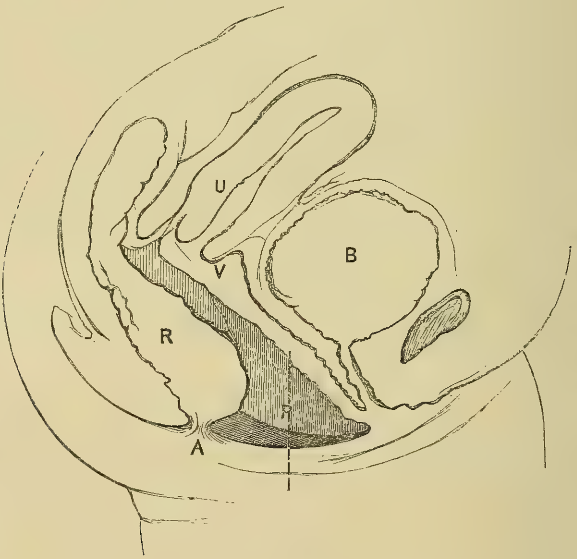

FIG. 178.

DIAGRAM REPRESENTING THE "PERINEAL BODY" MODIFIED AFTER THOMAS (R. B.).

A, anus; B, bladder; R, rectum; U, uterus; V. vagina ; P. perineal body; the upper part more lightly shaded represents the recto-vaginal septum, the darkly-shaded lower triangle is the perineum proper. The broken vertical line shows the limit of simple lacerations not involving the anal sphincter.

Indeed, prolapsus uteri does not always follow on laceration of the perineum. I have known sterility persist until the perineum was restored. Probably the loss of the retentive capacity of the vagina was the cause. The subject feels "open." She is conscious of being unsound. There is no support for a Hodge-pessary.

The nature of the injury will be understood on referring to

Fig. 178, modified from Thomas, and to Figs. 1 and 10 in this work. Fig. 1 represents the "perineal body" in its integrity. It forms a thick musculo-membranous cushion which supports the posterior and the anterior walls of the vagina. If the fore part of this cushion be divided, as shown by the dotted line in Fig. 178, the support of the anterior vaginal wall is impaired, but the sphincter being uninjured, control of the anal aperture is preserved. But if the rent extends quite through into the rectum, not only is the natural support of the vagina lost, but the control of the anus is also lost.

In restoring the perineum it must be borne in mind that this body or structure is of a triangular shape, the base below at the skin, the apex at the summit; and that anything less than the restoration of this triangle will be ineffective. For example, a superficial union as indicated by the dark shadowing in Fig. 178 will fail to give adequate support to the vaginal walls, and will in all probability give way at the next labour.

The operations for restoring the perineum: Preparatory steps.—All morbid complications should be as far as possible removed. A healthy condition of the parts should be obtained by cleanliness, and the cure of any complicating uterine disease. The bowels should be cleared by aperients and enemata. The time chosen is within a week after menstruation.

The operation differs in the two cases of partial and complete rupture. In the first case the operation is very simple, and should rarely fail. In the second case, the difficulty is often serious, and success has sometimes to be pursued in two or more trials.

The operation for partial rupture.—The patient is placed in lithotomy-posture. It is convenient to keep the knees fixed steadily apart by a transverse bar having a semi-circular rest for the knees at each end. The lips of the vulva are held apart by assistants by fingers or retractors. The operator marks out the outline of the surface to be pared. This is triangular, the deepest part extending from the skin-surface as high as the apex of the normal perineal body (see Fig. 178). From this apex the wound extends forward on either side to the edge of the labia minora narrowing to meet the skin. The paring should not extend forward beyond the natural extent of the perineum. The paring may be effected by carrying a sharp straight bistoury from behind forwards through the central line of the vagino-rectal septum, taking up only the mucous membrane. The knife is then carried outwards, so as to raise the mucous membrane in a thin flap on either side. The wound is then examined, and any projecting bit of mucous membrane or skin lying in the way of the parts to be brought into apposition is cut off. Bleeding is arrested by waiting awhile, by pressure, and by twisting any arterioles that may be severed. The sutures are then passed, beginning with the hindmost. The needle used may be one fixed in a handle, well curved, or a free needle carried by a forceps. The handle-needle is preferable. A double silver wire is carried. The first suture is passed on a level with the lowest edge of the pared surface about ¾ in. from the edge. It is carried fairly into the tissue behind the wound, so that, buried beneath, it is never seen until it emerges on the opposite surface at the same level. A second suture is passed in like manner, also buried, about ½ in. in front of No. 1. A third suture is passed which should not be buried; it runs across and is seen (Fig. 181, No. 3) traversing the vaginal orifice. More may be passed in like manner, according to the length of the wound. Thomas insists upon a point which appears to be of primary importance. He shows that to repair an injury involving the sphincter, the parted ends of the muscular

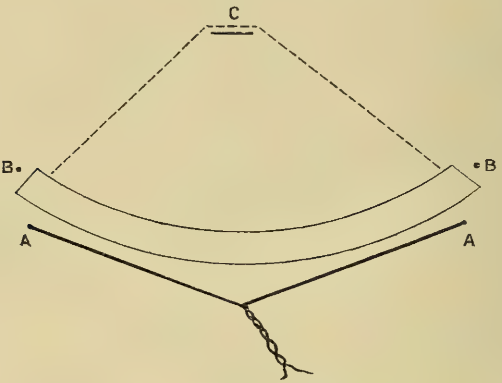

FIG. 179.—(AFTER THOMAS.)

B B, represents the split sphincter ani, A A; C, the course of the suture necessary to bring the ends, B B, of the sphincter together.

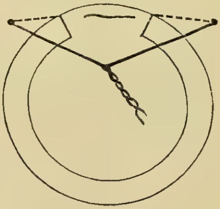

FIG. 180.—(AFTER THOMAS.)

SHOWING THE RING OF THE SPHINCTER ANI NEARLY RESTORED BY DRAWING UP THE SUTURE PASSED AS IN FIG. 179.

ring constituting this structure must be brought into accurate apposition. Fig. 179 represents the sphincter torn open, and the way of re-uniting the ends to reform the ring. The needle passed in at A, is buried along the course of the dotted line, passes under C, the anterior boundary of the anus, and comes out at A to the left. Drawing the suture up, the ring of the sphincter is reformed, as seen in Fig. 180, in which the two ends of the sphincter are brought nearly together. A little further tightening will complete the ring. To fix the sutures some prefer the quills, some various modes of twisting. Charles Brooke used broad flat beads, and contended, I think, with reason, that each suture could by this means be so set as to effect the most accurate contact of the wound. It is obvious that the pressure must be different in the case of the suture which is applied to the thickest part of the perineal triangle from that which is enough to draw together the thinner part of the wound in front. The beads adapt themselves perfectly to this varying condition. The drawback is that they are apt to bury themselves in the skin, causing sores. To obviate this the sutures should not be drawn too tight, and the beads should be large.

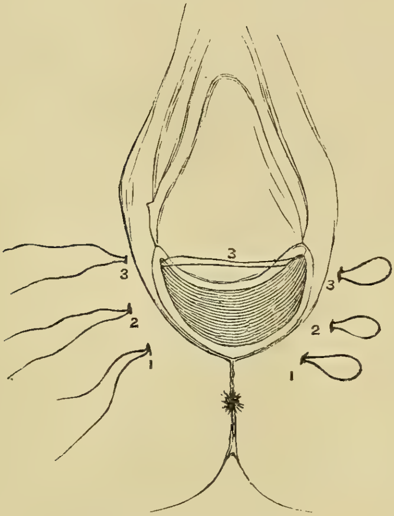

FIG. 181.—(AFTER THOMAS.)

SHOWING WOUND AND APPLICATION OF SUTURES IN RESTORATION OF THE PERINEUM.

1, 2, 3 represent the course of the sutures and the order in which they are introduced.

The quills effect much the same end as the beads. But being continuous rods they can hardly exert pressure adapted to the degrees of thickness of the wound as the beads do. And they also are apt to bury themselves in the skin. The best form of quill is the rounded ivory bar of James Lane, perforated in three or four places for the wires.

But many operators now discard quills, simply twisting the ends of the sutures.

If it be determined not to use quills or beads, the best plan is to bring the ends of the sutures together by Aveling's coil clamps and shot. This, like Brooke's beads, admits of regulating the tightness of each suture, according to the situation. I think the best plan is to pass the suture ends through a large Brooke's bead, and then to secure them by the coil-clamp and shot. A broader surface is thus ensured next the skin.

It is not necessary to divide the sphincter ani, to relax the tension on the wound, as Baker Brown did.

The sutures may be removed at the end of six or seven days.

The bowels need not be restrained by opium for seven or eight days. A winged catheter should be kept in the bladder, or the urine should be drawn off every eight hours. The deep sutures should be cut and removed, together with the ivory clamps, at the end of three or four days. Some œdematous swelling generally takes place, but soon subsides when the pressure of the sutures is removed. If left longer than this, irritation and suppuration are apt to be set up, and no compensating advantage is obtained. The superficial sutures need not be removed till the sixth or seventh day. The bowels may now be opened by a mild aperient, followed by an enema.

In the cases where the perineum has been torn through into the anus, somewhat greater care is necessary to secure accurate contact, and especially to prevent any aperture being left between the rectum and newly-made perineum. The latter untoward result may be best avoided by splitting the recto-vaginal septum for a short distance in the horizontal direction, at the point where it forms a sort of *éperon* at the centre of the torn part. Then, by turning up the vaginal portion of the split septum, and causing the two lowest of the deep sutures to take a hold of it on its new surface as they are passed through, it will effectually cover the spot where otherwise recto-vaginal communication might probably be left, while it will at the same time increase the thickness of the lower part of the new perineum. In this class of cases division of the sphincter is beneficial, as the action of the muscle otherwise tends to separate the surfaces, and especially to open the torn angle of the wound. But an incision on one side only is sufficient.

In the still more severe cases in which the recto-vaginal septum is torn for a greater or less extent upwards, the operation above described will be insufficient, as a recto-vaginal communication would be almost certain to remain. It is therefore necessary first to unite the recto-vaginal septum, and afterwards to restore the perineum. To unite the recto-vaginal septum the edges must be pared on each side, and a sufficient number of wire sutures inserted. These may be secured by simply twisting their ends, no quill suture being required. When union is complete and firm, which will usually be at the end of about three weeks, the second operation for the restoration of the perineum above described may be undertaken.

To secure fine adaptation of the rectal and vaginal mucous and of the cutaneous structures, the operation as described by Mr. Hulke is effective: Two triangular flaps of vaginal mucous membrane are first dissected up; then the cleft in the rectum is sewn with three fine silk sutures, the ends of which are left in the bowel. Several sutures of the same material are then adapted to the vaginal mucous membrane that had been previously dissected up. Next, the raw surfaces made by thus raising the flaps of mucous membrane are brought together with quilled sutures passed deeply, making a long and thick perineum; and lastly, the tegumentary edges of this are joined with fine silk sutures.

The *new formations* in the vagina are not numerous or frequent. They consist almost exclusively in fibrous tumours, cystic tumours, sarcomata, the papillary excrescence, and cancer.

Fibrous tumours and *sarcomata* are developed in the fibrous or muscular coat of the vagina, and often but not invariably are associated with similar formations in the uterus. The fibroid tumours project into the vagina, and sometimes assume a considerable bulk. Tumours also form in the connective tissue, between the rectum and vagina, and are developed equally towards either canal, or bulge out more into one or the other.

The sarcomata proceed mostly from the uterus, and from the cervix.

Mr. Curling (*Pathol. Trans.* vol. i.) describes a firm solid tumour growing from the upper part of the vagina, to which it was attached by a broad peduncle, which *commenced just behind the meatus of the urethra.* The tumour consisted of a mass of dense fibrous tissue partly arranged in large globules, and developed in the submucous areolar tissue of the vagina. It had been forming for many years, and lately had projected outside the vulva. Free bleeding occurred from one or two large vessels at the posterior part of the peduncle.

Papillary outgrowths are not so common in the vagina as on the cervix uteri, but they sometimes assume a cauliflower-shape, with a more or less defined stalk. At the entrance of the vagina they take the form of condylomata.

Cystic tumours are occasionally found in the walls of the vagina. They are certainly of rare occurrence. Thus Scanzoni says (1856) that he had only met with one case, and West's experience furnishes only two. Several clear examples have come under my observation. McClintock gives the histories of two cases. The origin and nature of these cysts are not clearly determined. In some cases possibly they resemble fibro-cystic tumours of the uterus, the cystic element being specially developed. In others, according to Huguier, they originate in obstructed mucous follicles. Scanzoni says, in autopsies one meets with cysts the size of a pea or of a cherry; but accurate information always proves that these neoplasms were not developed in the walls of the organ, but in the peri-vaginal cellular tissue. Rokitansky also says the primitive seat of these cysts is outside the vagina, with which they have only a secondary relation. This, I think, I have verified in some cases. Strictly vaginal cysts must be distinguished from vulvar cysts, which are not uncommon. There are two specimens of cysts removed from the vagina in Guy's Museum, Nos. 2281[80] and 2281[82]. I have removed two by wire-écraseur. In one case it appeared to me that the origin of the cyst was a blood-tumour or hæmatoma. I have seen several hæmatomas of the walls of the vagina not always traceable to labour. The absorption of the blood would leave a cyst which would subsequently be filled with serum or muco-purulent fluid.

The treatment consists in removing the tumours altogether, if this can be done without involving too extensive a wound. Otherwise they may be laid freely open by bistoury, and the cavity plugged with tincture of iodine on lint.

They sometimes burst and continue to pour forth an offensive discharge. In a case under my care in St. Thomas's a cyst burst into the urethra. It gave rise to extreme dysuria. It caused a considerable fluctuating swelling in the vagina. It was cured by free cauterization with nitrate of silver of the cavity of the cyst through the urethra.

Dr. Gibb described (*Path. Trans.*, vol. v.) a specimen in which small calculi (phlebolithes) were taken from between the coats of the vagina in a coloured woman.

Nitric acid or the actual cautery may arrest the disease, or produce for a time a healthier surface. Bleeding may be controlled by plugging with pledgets of lint soaked in solution of perchloride of iron, or in tincture of iodine, or with the styptic cotton-wool.

Primary *cancer* of the vagina is rare. McClintock says no well-marked and undoubted instance has fallen under his notice. In all cases of vaginal cancer, the disease he found had spread from the uterus or the vulva. Dr. West believes that the rarity of primitive vaginal cancer has been exaggerated. And I have seen several cases where epithelioma began at the meatus urinarius. I have now and then met with a peculiar contraction of the vagina in old women, attended with ulceration and offensive discharges, which I believe to be of cancerous nature, and in which I concluded that the uterus was not involved. In one case which came under my care at the London Hospital, that of a woman aged seventy, there had been for ten months a sanguineous discharge of "dirty white" colour, pain down inside thighs and lower belly, chiefly at stool. She was obliged to lie down; she felt as if sitting on a sharp instrument. About one inch up the vagina, an annular constriction was felt just admitting the finger; through this was a pouch, at the back of which was the enlarged and hardened os and cervix uteri. The sensation was much as if the finger passed through a fistula into the rectum. But passing one finger into the rectum and one into the vagina, the septum was felt perfect, and her "stools passed the right way." Blood flowed on examination. Atresia of the canal is not uncommon when the vagina is the seat of cancer. Rare as is vaginal cancer, there may occasionally be seen here and there scattered over the vaginal surface independent roundish, or flat medullary watery projections, discoid or honey-comb elevations of the cauliflower excrescence.

The vagina affords, like the peritoneum, clear opportunities of observing how cancer can propagate itself by contact. Thus it is not uncommon to find a patch of cancerous growth on the opposing surface of the primary seat of the disease. Dr. Cayley describes (*Pathol. Trans.*, xvii.) a case of epithelioma propagated by contact from the posterior to the anterior wall of the vagina.

The *diagnosis*, presuming that a digital examination is made, is easy. The rough, hardened, contracted walls of the vagina communicate a sensation different from that of the healthy, or of any other diseased state of the vagina. The speculum will expose the disease. The examination, howsoever gently made, is moreover pretty sure to cause a little bleeding; and the offensive discharge supplies further evidence.

The *course and terminations* of vaginal cancer resemble those of uterine cancer. Indeed, in almost every case vaginal cancer is but an ulterior stage of uterine cancer. The disease extending deeper invades the rectum and bladder, leading probably to perforation. Death occurs through exhaustion, blood-infection and degradation, mechanical impediment to the functions of the bladder, kidneys, and intestines.

In *treatment* unhappily little can be done. There is no room for attempt at ablation. We can but seek to arrest progress by powerful caustics, and failing this, fall back on palliative measures.

The palliative treatment differs in no respect from that described as applicable to cancer of the uterus.

CHAPTER XXIX.

THE DISEASES OF THE VULVA.

INFLAMMATION: GENERAL OR PARTIAL; OF THE VULVO-VAGINAL GLANDS; ABSCESSES; ULCERATIONS; SLOUGHS; HÆMATOMA; VARICOSITY; PRURITUS; ECZEMA; FOLLICULITIS; HYPERTROPHY OF LABIA AND CLITORIS; "ENDERMOPTOSIS;" NEUROMATA; CYSTS; SYPHILITIC WARTY EXCRESCENCES; LUPUS; CANCER; MELANOSIS; VASCULAR EXCRESCENCE AND OTHER GROWTHS OF THE MEATUS URINARIUS AND URETHRA; FISSURE OF THE VULVA. COCCYGODYNIA.

Some of the diseases of the vulva are marked by exquisite pain. The free distribution of sentient nerves, the richness and complexity of the vascular apparatus, and the multiplicity of the delicate organs accumulated in this region, account for this feature. Another condition to be noted is the active reflex association with the nervous centres, cerebral and spinal. This is remarkably manifested when we induce anæsthesia to facilitate examination or operations. The vulva seems almost the last part in which the reflex irritability is suspended. The reactions upon the general nervous system are often complicated and distressing, and are not seldom overlooked. In addition to these conditions, which always exist, there is often found a morbid neurotic element inherited or acquired, or a blood dyscrasia or diathesis, as gout.

Inflammation of the vulva—vulvitis—may be *partial*, that is, limited to a part of the structures of the vulva, as to one vulvo-vaginal gland and one labium; or it may be *general*, that is, involving all the structures of the vulva on both sides. It may be limited to the vulva, which is not uncommon, or it may be complicated with colpitis.

The vulva is liable to various forms of inflammation: Erythema, phlegmonous inflammation of the labia, acute or chronic, furuncle, erysipelas, herpes, eczema, prurigo, and the follicular inflammation of Huguier. Œdema is a frequent complication of these affections. They often leave a degree of thickening, hypertrophy, or sclerosis of the tissues of the nymphæ, clitoris, or vulva.

Inflammation of Bartholini's glands is frequently caused by unclean sexual intercourse, especially of a gonorrhœal character. I have seen a chronic inflammation, which had lasted ten months, disappear quickly under no other treatment than iodide of potassium. I had suspected syphilitic disease. It may be the result also of want of cleanliness, and the irritation produced by the retention and partial drying of leucorrhœal discharges.

Inflammation having attacked the substance of the gland, causes extreme pain from the distension of the gland within its capsule and the surrounding connective tissue. The inflammation may be limited to the gland and its duct, or may spread to the loose connective tissue around. In either case abscess may form. When the gland is the chief seat of the inflammation, a swelling forms of an ovoid shape, distending one labium major, and causing it to protrude so as to overlap and conceal the labium on the other side. The surface of the tumour is usually vivid red, shining from tension, and bathed with a serous mucus. The size varies from that of a pigeon's egg to that of a hen's egg. Bulging over towards the opposite side, it narrows the entrance of the vulva so that the introduction of the finger causes exquisite pain. It is generally possible to detect the orifice of the duct of the gland on the inner surface of the labium. Pus accumulating in the gland may from time to time force its way out of the duct, then collect again. But most often this mode of evacuation is imperfect, and great distension is the result. Even when the abscess has burst, an obstinate secretion of pus may go on for an indefinite time. The subjective symptoms are intense pain and a sense of throbbing in the part.

When the inflammation spreads to, or has its chief seat in the cellular tissue of the labium, the symptoms and appearances are similar. Perhaps the pain is less; but pain is a relative term, often more expressive of individual susceptibility than of the intensity of the disease, so that no conclusion can be drawn from this. Where the cellular tissue is affected, the swelling extends much beyond the limits of the gland. It may terminate in resolution, but suppuration is, I think, the more common event. In this case fluctuation soon becomes evident.

Abscess of the gland itself will not often burst. After a time the inflammation may even subside, and the cyst formed may be tolerated. I have known many examples of this condition. It is nevertheless desirable to lay them open when detected, as they may at any time be the occasion of renewed trouble.

In the treatment of inflammation of the labia majora and Bartholini's gland, the first thing to enjoin is rest. Indeed, this injunction is not very likely to be disregarded, the pain on movement, especially in the upright posture, is too agonizing for that. If suppuration has not begun, leeches, poultices, and lead lotion give most relief, and dispose to resolution. When the formation of pus is made out, a tolerably free incision should be made. As the part is very vascular free bleeding may follow; but this gives such obvious relief that it ought not to be immediately stopped. If it goes beyond desirable bounds it can be readily stopped by compresses alone, or by a tent soaked in perchloride of iron or tincture of iodine. A poultice should be applied after the incision. An abscess of the cellular tissue thus treated will commonly heal without further trouble. But if it is the result of inflammation of the gland itself, something more may be necessary. The contents of the inflamed Bartholini's gland are not always simple pus; a glairy tenacious mucus often is mixed with pus. The distension may have produced a cystic dilatation of the gland, the inner surface of which will secrete even after it is laid open, unless its character be changed by the free application of some strong escharotic or irritant. I have never found any trouble with these cysts, if the cavity be stuffed with a strip of lint soaked in tincture of iodine. They quickly shrivel up; the remaining cavity gets filled by granulations.

If abscesses of the vulva are allowed to burst, or have been insufficiently laid open, fistulous tracts are apt to form, which keep up great irritation and discharge, and even inflammation and induration of the tissues around. The treatment of these sinuses consists in giving them a free external opening, and in injecting a solution of iodine into the tract.

Ulcerative loss of substance occurs in the form of excoriations, superficial ulcers, and small follicular and larger abscesses. The vulva is also liable to lupus and syphilitic sores.

Sloughs of the vulva are especially apt to follow severe labour, and may result in various degrees of cicatricial atresia. They may occur after typhoid, scarlatina, diphtheria, and may be primary, as in the noma of young children.

There is a *gangrenous vulvitis* sometimes seen in girls following on scarlatina. For this Guersant and Trousseau applied the actual cautery. Rilliet and Barthez used chloride of zinc. Parrot (*Progrès Médical*, 1874) recommends iodoform in powder. He says it is almost painless. It must be used freely, and renewed twice a day for two days.

Hæmorrhages of the Vulva.—Hæmatoma, or thrombus of the labia majora, is produced under the obstruction caused to the return of blood by the advancing head during labour, and also by the bruising and laceration occasioned by the passage of the head. It may also proceed from submucous rupture of varicose veins. It sometimes attains the size of a fist, or even of a child's head, and consists sometimes more in a diffused extravasation of blood in the connective tissue of the labia, sometimes rather in a collection of blood poured out into a sac formed by rending away of the mucous membrane from the underlying tissues. If the mucous membrane be torn through, free external bleeding may ensue. The extravasation may spread upwards, dissecting the mucous membrane up, and burrowing behind it far into the pelvis. Suppuration at times takes place in the sac, and gives rise to repeated bleedings. I have seen a marked case of hæmatoma of the clitoris and urethra.

The pudenda are subject to a *varicose dilatation of the vessels*, a condition which may prove serious. During pregnancy the vaginal and pudendal plexuses become still more highly developed; the augmented afflux of blood, and the occasionally increased obstacle to its return from the pelvis, may lead to considerable dilatation of these plexuses. The inside of the vulva and lower part of vagina at times assume a distinctly convoluted appearance, owing to the prominence of the vessels; these bulge forth turgid, elastic, deep red, or purple.

In this condition, should a breach of surface take place at any point, profuse, even fatal bleeding may easily occur. A blow may rupture the vessels by bruising them against the pubic bones. Simpson says, "In the Scotch law courts during the last five-and-twenty years a considerable number of trials have taken place in consequence of women bleeding to death after sustaining some injury of the pudenda. In most of these cases all that was alleged as the cause of death was that the woman had received a kick on the part at the time she was pregnant, and that a slight laceration had been produced, from which the fatal hæmorrhage took place." Some years ago a butcher was tried at Bristol for killing a married woman. Rupture of the pudendal vessels had taken place during coitus. But rupture of the gorged vessels may occur spontaneously, that is, without any direct violence to the part.

Varicose veins of the legs during pregnancy may present a similar state of turgidity, entailing a like danger. I have known a woman bleed to death from a slight injury inflicted on a bunch of such veins.

The varicose condition, of which the foundation was laid in pregnancy, persists more or less when the pregnancy is ended. The affected vessels become less turgid, but may undergo changes disposing to danger in another way. Thrombosis taking place in them, necrosis of the walls of the vessels may ensue, and thus becoming perforated, may be the source of hæmorrhage or ulcers; inflammation of a low, sometimes erysipelatous type is common.

When hæmorrhage takes place from varicose vessels of the vulva or vagina, the one effectual remedy is pressure. This must be firmly applied. The best way is by plugging the vagina above and down to the level of the bleeding points. The horizontal posture and moderate diet of course will be enforced. Simple compresses dipped in cold water will answer the purpose. But occasionally it may be found desirable to soak them in a solution of perchloride of iron.

Although pregnancy is the usual antecedent of varicose veins, I have known very severe cases which could not be traced to this condition.

Pruritus is one of the most distressing of the affections of the vulva. It is associated with, or dependent upon, a variety of conditions, so that it may generally be regarded as symptomatic. Before determining upon a course of treatment, it is a clear indication to investigate thoroughly the state of the pelvic organs, and even to study the general condition of the system. In some cases the irritation depends upon diabetes. In some there is a gouty diathesis or lithiasis, the blood carrying irritating elements to every organ and tissue of the body; pain is especially evoked in certain elected parts, the vulva being one of these. In some there is congestion or inflammation of the cervix uteri, and the attendant discharges appear to be the immediate cause of the vulvar pruritus; but, in some instances, there is pruritus, intra-vaginal, as well as pudendal, without any discharge. Then, in a considerable number of cases, there is obvious pudendal disease, as herpes, eczema, erythema, scabies, pediculi.

In some apparently inflammatory cases, it is difficult to say whether inflammation or neurosis predominates. In many of the most painful of these disorders there is no very obvious inflammation, and in others, where inflammation is obvious enough, the pain, although generally troublesome, is more endurable. Some of them have been described under the head of climacteric diseases. It is at this period that the most troublesome cases occur. This, indeed, is especially the epoch of irregular disorderly nervous affections. But other forms may occur in young women, married or single. One form especially arises during pregnancy, a time when the nervous system is in a state of peculiar erethism, and when the seat of the pruritus is peculiarly vascular and hyperæsthetic. I have seen a very troublesome form in single young women following a sedentary occupation as governesses. The sitting may have an injurious local effect, but probably emotional and other centric nervous conditions may be influential. And this may, I think, be stated as a general proposition: there must be exaggerated centric irritability as well as an eccentric irritation to produce the marked forms of pruritus. This is why it is so frequent in pregnancy. Indeed, it is not uncommon to find in obstinate cases that a general irritation or hyperæsthesia of the skin becomes gradually developed.

It is remarkable that most of these painful affections of the vulva are aggravated at the menstrual epochs. This is due, no doubt, to the exalted centric irritability attending ovulation, as well as to the increased local vascular fluxion. A similar exacerbation is observed in neuralgia of the face and other parts. Indeed, there are cases of intense vulvar pruritus where no local lesion can be detected, which might with propriety be called vulvar neuralgia.

A considerable proportion of cases are due to inflammation of the structures about the vulva. These are already described. A not uncommon form in climacteric women tending to obesity is *eczema*. In cases of this kind the disease is not limited to the vulva but extends to the dependent fold of the abdomen, to the folds of the groins, to the upper parts of the thighs; in fact, to all those skin-surfaces which overlap each other and chafe. The skin loses its natural epidermal character, becomes moist, red, angry-looking, approaching to the appearance of inflamed mucous membrane. Sometimes aphthous or diphtheritic patches form. The labia majora are often much swollen, even hypertrophied. Minute vesicles or pustules give place to scabs. Sometimes little abscesses form and burst.

I have seen pruritus from eczema brought on by gonorrhœa, and the use of irritating lotions. In one such case, that of a young woman, a pustular eczema spread all over the mons Veneris, the labia, and inner side of the thighs. Nitrate of silver had been used freely without benefit. She was cured by healing the attendant metritis and vaginitis, and by the local application of zinc ointment.

Pruritus is not uncommon in connexion with cancer of the uterus or vagina. My observation confirms the statement of McClintock that, in many cases, pruritus of the vulva is one of the earliest symptoms of cancer of the womb.

In some cases the pruritus is due to the breeding of pediculi. These are effectually treated by mild mercurial ointments. In hospital, the nurses ask for stavesacre for this purpose. It answers well. But there are other cases in which the affection is in no way associated with parasites, which are remarkably benefited by stavesacre. The prurigo senilis, for example, is successfully treated by Mr. Balmanno Squire's formula, consisting of oil of the seeds 1, lard 7. In this disease I have also seen great advantage from the application of a pasma formed of flower of sulphur and water.

A not uncommon form of vulvitis is the *vulvar folliculitis* of Huguier. This affects the labia majora, the external aspect of the labia minora, the genito-crural folds, and is limited to the sebaceous glands and hair-bulbs of these parts. These parts appear slightly swollen, rosy, and are the seat of small elevations due to inflammation of the sebaceous glands and hair-bulbs.

These are very numerous, are at first small, then enlarge, and resemble pustules, and soon suppurate. Bursting, they discharge an irritating, offensive, purulent matter. This vulvitis is frequently complicated with erythema, ecthyma, sometimes with œdema, erysipelas, or abscess. It is principally observed during pregnancy, when this secretory apparatus is very active.

In a variety called "*vulvite folliculeuse*" by Robert, the mucous membrane of the vestibule and that covering the interior of the crypts only are affected. The mucous crypts present at their orifices a vivid red areola; their cavities enclose a droplet of pus, which can be squeezed out. This vestibular vulvitis, Robert says, is always more or less allied to urethral blennorrhagia.

The *treatment* should first of all be directed to the removal or relief of the complicating conditions, local and constitutional. Where there is uterine disease attended by discharges, this should be cured. Perfect cleanliness by vaginal injections of water or astringent solutions should be enjoined. Thomas advises the use of a cotton tampon saturated with glycerine mixed with a little borax or acetate of lead, applied daily in the vagina. It protects the vulva from irritating discharges.

If there is acute or sub-acute inflammation of the skin or mucous membrane, the local applications must be of a soothing kind. It may be necessary in the first instance to apply poultices or poppy-head fomentations, lead lotions, copious vaginal irrigation with tepid water or bran-water, observing rigorously a light diet and avoiding stimulants.

Constitutional treatment is often of the greatest importance. It is necessary, in the first place, to remove, if we can, any complicating, local, or general disease. In women who have reached the climacteric, in whom there is probably a gouty or lithic acid diathesis, strict attention must be paid to the correction of this state. Alteratives, mercurials, salines, alkalies, aloes, colchicum, podophyllin, taraxacum, are often indicated. The peculiar nervous condition of the climacteric age must be studied. Bromide of potassium in large doses is of essential service. Digitalis and aconite are useful. Sometimes we are compelled to resort to more decided narcotics, as opium or chloral.

When clear urine and well-acting bowels indicate that the blood is comparatively freed from lithic acid and other impurities, tonics as bark or quinine are often useful. Guéneau de Mussy insists that a gouty or other diathesis is often present. He advises the use of small doses of arsenic. Such patients should avoid stimulants, especially beer; and moderate exercise in the open air should be enjoined.

When the inflammatory condition is subdued, we may try in succession a variety of local measures. Guéneau de Mussy recommends the following means:—Emollient baths containing poppy, or laurocerasus, belladonna, aconite, or pulverized water with belladonna; a weak solution of bichloride of mercury, alkaline washes, vaseline or glycerine with calomel, tannin or benzoin. Intra-vaginal washes of decoctions of rice and poppy-heads are useful. In the chronic form, strong sulphur baths, some hypo-sulphite baths, as those of Aix, pomades with mercury and belladonna, carbolic acid lotions or black wash come into use. But we must be prepared to find some cases for a long time rebellious to all treatment.

The pruritus of pregnancy is associated with the exalted centric nervous irritability developed by pregnancy, and with the increased local afflux of blood. Leucorrhœa generally attends, and the vascular fulness exceeds the usual degree. Saline purgatives, as Püllna or Friedrickshall water; alkaline baths, as Vichy, which can be prepared at home; or even bathing with plain cold or tepid water constitute the best palliatives. Salines and colchicum may be indicated. Bromide of potassium may be useful.

Amongst the acquired abnormities of the vulva is *hypertrophy*, which sometimes assumes a monstrous appearance. In its ordinary forms it consists of increase of volume of the cutis and subcutaneous connective tissue. It affects the entire vulva, or only a part, as the nymphæ, or the labia majora, or the clitoris. The mass thus formed may attain the weight of several pounds. The surface of the enlarged part is smooth, or rough from irregular growth of epidermis, generally warty, uneven, lobulated. In these cases the tumour reproduces all the marked characters of the papillary growth, and resembles the condyloma. In its substance it consists of dense fibrous connective tissue. Often the hypertrophy spreads upwards over the mons Veneris, and backwards over the perineum. Frequently the mass, under traction of its own weight, becomes pedunculated, and its removal is then easy. I have known the labia minora enlarged so as to form flaps hanging down below the labia majora to be a source of trouble, especially during the menstrual periods, when they swell from congestion, and by chafing against each other produce irritation and leucorrhœa. It may assume the character of elephantiasis.

Atrophy of the labia occasionally follows chronic syphilitic affections of the vulva, attended by progressive cicatricial formations.

The *clitoris* is subject to abnormal enlargement. This, says Rokitansky, is more often congenital than acquired. This is one of the conditions which, especially when conjoined with excessive development of the nymphæ, as is often the case, simulates hermaphroditism. The gland may be very large, and the prepuce so developed as to resemble a penis, whilst the enlarged nymphæ assume the appearance of a scrotum. There is a good example of this malformation taken from an infant in St. Thomas's Museum.

As the subject of hermaphroditism has little clinical interest, I must refer those who seek information on it to Rokitansky's *Pathological Anatomy.*

Little tumours are sometimes found in the labia, which Huguier has described under the name "*Endermoptosis.*" These are due to hypertrophy of the sebaceous glands. They are not painful; they give vent on squeezing to sebaceous matter. The radical cure is to cut them out with scissors.

Neuromata of the vulva have been described by Simpson as sensitive points and structures external to the orifice of the urethra, and as analogous to the caruncles of this part. True small nodular neuromata may be found under the mucous membrane here as well as in other parts of the body. They are the occasion of much suffering, and to obviate this the removal of the offending nodules is necessary.

Vascular outgrowths occur as *teleangiectasis* in the labia majora, and as the vascular excrescence of the meatus urinarius.

The tumours or outgrowths of the vulva are so well described by M'Clintock that I am induced to follow his account. He classifies them as—1. Warty and hypertrophic; 2. Fibrous and fatty; 3. Cystic; 4. Vascular; 5. Cancroid and carcinomatous.

Warty (*syphilitic*) *excrescences* may grow from any part of the vulva, but they most commonly appear around the orifice of the urethra or of the vagina; in this latter case they look like elongations of the corpora myrtiformia. They are usually found in clusters, but sometimes occur singly. Often three or four grow by a common root. Their colour is nearly white, and their structure tolerably firm. They are probably always of syphilitic origin. They seldom cause much pain, but they cause more or less local irritation and mucous discharge.

At least two varieties of warts are met with on the vulva. One of these, says M'Clintock, is the true warty excrescence, the verruca or thymion of Celsus. It is very similar to the warts which appear on the hands, except that it frequently has a pedunculated shape, the stalk or neck having a smaller diameter than the body of the growth. When of large size they are apt to be fissured at the top, and to bleed if scratched or otherwise hurt. They have the colour of the surrounding skin, and do not yield any discharge. The greater labia and adjacent common integument are the parts from which these warts generally spring. Warts of the other kind or variety grow from the vestibulum, meatus urinarius, carunculæ myrtiformes, or some of the parts ordinarily concealed within the vulvar sinus. Their structure is firm, but they are remarkably pale in colour and semi-transparent, so as to bear much resemblance to the white muscular tissue of fish.

Considerable hypertrophy of the nymphæ, clitoris, or more rarely of the labia majora, is not unfrequently associated with these warty excrescences, a circumstance which M'Clintock suggests strengthens the probability of their being due to some venereal taint. But these enlargements frequently occur when there are no warts, and they may unquestionably occur where there is no syphilitic taint. The syphilitic hypertrophy is generally marked by a rugous warty surface; and other evidence of syphilis, either historical, or still impressed upon other parts of the body, as the skin or throat, will rarely be wanting. Surgeons are familiar with the mucous or gummous tubercle or condyloma of the anus in syphilitic patients. Not unfrequently the anus is affected at the same time as the vulva, and then the syphilitic nature of the vulvar growth is at once recognized.

In St. Bartholomew's Museum is a specimen, No. 32.80, of a large fibro-cellular tumour, which was attached by a broad pedicle to the left labium of a woman aged thirty-five. It had existed for ten years. Three years previous to its removal she had syphilis, since which time it rapidly enlarged.

These growths should be treated in the same manner as the gummous tubercle of the anus. In the early stage the warts may sometimes be dispersed by astringent and caustic applications; keeping the parts very dry, and dusting them frequently with prepared chalk, or some other absorbing powder, will occasionally remove them. The syphilitic growths are often effectually treated by frequent powdering with calomel. A very effective application is painting with strong acetic acid. This has seemed to me even better than nitric acid.

But when the growths have attained a considerable size, extirpation by knife, scissors, écraseur, or galvanic cautery is by far the best plan. When cut off on a level with the surrounding mucous membrane they are not likely to be reproduced; but if a portion of the base or stem be allowed to remain, this is very apt to throw out fresh shoots or processes. I have removed a very large mass of syphilitic tubercle of the labia at an advanced stage of pregnancy, on the ground that during labour laceration might occur. It is, I believe, under all circumstances, best to remove them. Should hæmorrhage occur after ablation, it may be restrained by pressure with or without perchloride of iron, by the actual cautery, or still better by acupressure. Needles transfixing the bleeding surface and twisted sutures will effectually stop the bleeding.

Although I believe the syphilitic excrescence can generally be distinguished from other forms, we meet in practice with growths which present considerable resemblance to them where there is no room to admit the complication with a venereal taint. Dr. West is undoubtedly right in his statement that some of these belong to the same class as lupus, " and are quite independent of venereal taint, and of these some pass by gradations, difficult to seize, into the same class with epithelial cancer."

To these forms the names *herpes exedens, lupus, rodent ulcer, tertiary syphilis, esthiomenus* (Alibert) have been applied. Huguier adopts the last.

Cancer, frequent in the uterus, rare in the vagina, again becomes frequent in the vulva.

The medullary cancer occurs very rarely as a primary disease of the labia. It is most commonly a propagation of the disease from the vagina in association with cancer of other organs, and especially with medullary warts in the skin and consecutive cancer of the inguinal glands.

More frequent is the epidermal cancer (cancroid), which appears as a proliferating widely spreading degeneration of the labia or clitoris. This latter organ is especially prone to cancer, and like the same disease in the penis, it may for a considerable time be limited to the organ. Owing to its almost external position, and the distress which the disease and attendant enlargement produce, it is generally detected early. These circumstances make ablation especially hopeful. It is not wise to be deterred from operating even when there is evidence of enlargement of the inguinal glands. A respite of comparative ease may at any rate be counted upon. The operation should be thorough. The patient is placed in the lithotomy position. The diseased part is firmly seized by a curved Museux's forceps, and drawn out so as to put its attachments upon the stretch. With strong scissors the mass is cut away close to the pubic bones. Free hæmorrhage is likely to follow. This may be restrained by the actual cautery, or by very firm pressure by compresses. A mode of proceeding preferable when the diseased mass can be fairly commanded by the wire-loop, is the galvanic cautery.

Beginning in the clitoris, cancer spreads to the contiguous structures, and soon invades the labia minora et majora. When this is the case, the prospect of relief is much diminished. Still ablation may in some cases be attempted.

Where ablation has to be abandoned, we must fall back upon caustics or palliative treatment. All the measures adopted in the case of cancer of the uterus find application here.

In St. Bartholomew's Museum is a specimen (No. 32.61) of *melanosis* of the labia and vagina. The parts were removed by operation, on account of a large mass of melanotic disease, which, arising at the front part of the vagina, encroached equally upon either labium.

In the same museum is another specimen (No. 32.42) of a labium on the surface of which is an oval elevated warty growth of moderately firm texture, and with a finely-granulated surface, very similar to the *chimney-sweeper's cancer* of the scrotum.

The *vascular excrescence, caruncle, or tumour of the meatus urinarius.*—This is in many cases an outgrowth from the mucous membrane of the urethra, most commonly found at the meatus. At this orifice it often protrudes, bulging out as a small tumour, sometimes, but rarely, as large as a cherry. When it so bulges, of course it is easily seen, and so it has come to be described as a disease of this particular spot. But a similar condition not seldom extends a little distance up the urethra. The word "vascular" gives a good idea of its appearance. It may be roughly described as an outgrowth of vessels loosely held together in a mass by a little connective tissue, and covered by a thickened mucous membrane. The surface is irregular, a little lobulated, deep red or blue-red. It is soft, difficult to seize with tenaculum or forceps, it so readily breaks down. The morbid mass and appearance are generally bounded by the margin of the urethral orifice, that is, the growth seems to be peculiar to the urethral mucous membrane; it stops abruptly at the mucous membrane of the vulva.

Quekett examined one of these vascular growths, and found it to be composed of epithelial cells, and a number of capillaries coming up close to the surface. This explains the occasional tendency to bleeding. Wedl, in his *Pathological Histology*, describes and figures the appearance presented by the urethral caruncle. He regards these bodies as "dendritic, papillary new formations of connective tissue." The one he examined was of a somewhat elongated figure, of a bluish-red colour, and spongy texture, and exhibited when cut into, cavities containing colloid matter. The most interesting point was the distribution of the blood-vessels, which could be very distinctly traced in transverse sections, moistened with a solution of sugar or common salt. Their ramification precisely resembled that seen in the vasa vorticosa. Several vessels of considerable size entering one of the lobules divided into a multitude of smaller ones, which, though not of capillary dimensions, made numerous undulating curves, extending up to the periphery of the lobule, where they terminated in mostly short and abrupt loops. The walls of these vessels were everywhere simple, like those of capillaries. There were extravasations of blood at several points, of old and recent occurrence. The late Dr. John Reid examined for Sir J. Simpson a very sensitive and painful caruncle, and came to the conclusion that there was a very rich distribution of nervous filaments in it. It seems, in many cases, to be analogous to hæmorrhoids in the anus.

It is most frequent, according to my observation, in women who have reached the climacteric, or passed it, and who have been married. But it is found occasionally in girls and young women, single or married. There is a tendency to venous hæmostasis in the pelvic organs, especially in the mucous membrane of women advancing in years, which appears to me to predispose to these irregular vascular protuberances. The excrescence may be "gummous." At least, I have seen cases connected with secondary syphilis. And Scanzoni believes they result from chronic urethritis. In many instances there is a history of gonorrhœa.

The principal *symptom* of the disease is acute agonizing pain on micturition, compelling the sufferers to postpone the inevitable torture by submitting as long as they can to retention in the bladder. Hence there is a retrograde risk of inflammation of the mucous membrane of the bladder, and distension. Not uncommonly a little blood is passed with or after the urine; and bleeding may occur at other times, as from rubbing to ease the pain, friction in walking, and sexual intercourse. Dyspareunia is almost a necessary consequence. Often there is a muco-purulent discharge from the urethra and from the vagina, which may be an accidental complication. Pains in distant parts seem to take their rise from this local disease as reflex or sympathetic phenomena. The general health is often seriously impaired.

It may give rise to the suspicion of stone in the bladder. The constant pain exhausts the nervous force, inducing prostration and disorder of the functions of other organs. The real source of the mischief is often long overlooked by those who neglect the prime clinical maxim of making a direct examination of the part which is the central seat of pain.

The *diagnosis* is made out by taking the indication furnished by subjective sensations as the guide to objective exploration. The patient lying on her side, the upper labium is drawn up so as to expose the structures of the vestibulum, when the angry-looking orifice of the urethra will be seen. By passing a catheter gently we gain information as to the state of the urethra beyond the meatus. And it is often useful to dilate the urethra with a Weiss' dilator, or the excellent instrument contrived by Dr. Emmet for dilating the cervix uteri.

The *treatment* consists in destroying the offending growth. This may be done more or less successfully by various methods. Where there is much irritation, and the patient declines to submit to operation, some relief may be had from lead lotion, or poppy-head fomentations. Simpson speaks highly of an ointment consisting of two drachms of hydrocyanic acid to an ounce of lard. A bit of this of the size of a pea is applied to the part three or four times a day. Aconite and chloroform ointments are also useful. But things of this kind can only be sanctioned as temporary and trivial palliatives. If the tumour present a distinct polypoid form, it may be removed by a ligature, by snaring it, and cutting through its base by a fine wire écraseur, or by snipping off with scissors. Excision is better than the ligature. The tumour must first be seized with a small hook or forceps, and lightly drawn out, so as to enable the scissors to get well at the base. Some bleeding usually follows, but compression with a bit of lint steeped in solution of perchloride of iron, or touching with the actual cautery, will soon stop it. Still these troublesome growths are very apt to recur. There seems an active germinating or proliferous property in the mucous membrane from which they rise, so that the smallest particle left retains the property of reproducing the disease. Mere excision, says Richet (*Gaz. des Hôp.*, 1872), will not remove the contraction and hypertrophy of the urethra, which often give rise to the most painful symptoms. To effect this he advises forcible dilatation of the urethra.

I have applied nitrate of silver repeatedly, always with good effect for a short time, although causing great pain at the moment of application. I have also used potassa cum calce, nitric acid, strong carbolic acid, and other caustics, all with more or less advantage. But the best plan, I believe, is to touch them with the actual cautery, either the hot iron or copper, or the galvano-caustic wire or button. Cold-water dressing should be applied after the operation, and astringent lotions when the sloughs have fallen.

Rizzoli, in a useful clinical memoir (1875) on the growths which are developed inside the female urethra, describes a case of *angioma* of the urethra, and another of the clitoris. These excrescences were formed of vessels possessing a degree of erectility.

Small *mucous polypi* may form in the urethra, cause dysuria and bleeding. Polypi of fibro-cellular structure are also found. They may be removed by scissors; and if any bleeding ensue, a light touch with the actual cautery, or pressure with a plug soaked in tincture of iodine, will stop it.

The orifice of the vagina is subject to *fissures*. These are found as linear irritable ulcers, or clefts in the mucous membrane. The most frequent seat is the posterior commissure, but I have seen them at the anterior commissure. They are sequelæ of slight lacerations experienced during labour; they have been produced by coitus, and have resulted from an altered condition of mucous membrane, caused by inflammation, especially of a syphilitic character. As fissure of the anus is a source of pain during the performance of the functions of this part, so is fissure of the vagina or vulva. It may be chafed and irritated by walking, by discharges, by a drop of urine; but the most distressing symptom is dyspareunia. The painful spot may be detected by digital examination, and by retracting the labia it may be brought into sight.

The treatment is the same as for anal fissure. The edges may be torn open by the fingers, or it may be divided by the knife. But the incision should not be deep, lest severe hæmorrhage ensue. It is enough to make a shallow incision through the base of the ulcer.

I have in several cases observed that *epithelioma* began around the orifice of the urethra. The actual cautery may in such cases be applied with fair success.

COCCYGODYNIA.

This disease has become familiar to gynæcologists through the writings of Sir James Simpson (*Diseases of Women*, 1872, vol. ii., edited by A. R. Simpson). But Dr. J. C. Nott, of New York, in an interesting memoir on the subject, refers to two cases published by himself in the *New Orleans Medical Journal* fifteen years before Simpson's first communication.

The name is derived from coccyx and ὀδύνη, pain. The leading symptom is pain in the region of the coccyx felt by the patient whenever she sits down and rises, and sometimes when she remains in a sitting posture. Most of the patients affected with it are obliged to sit on one hip, or with only one side resting on the edge of a chair, or with the weight partially supported by a hand on the chair. Some patients dread sitting down. There are other movements of the coccyx liable to be attended by pain. Thus, patients have pain with every step they take, whilst in others walking causes no uneasiness. Others feel the pain most when the bowels are being evacuated, or under any circumstances in which the sphincter or levator ani, or the ischio-coccygeal muscles are called into action. The pain is not in every case very acute, nor at all times equally severe. The distinguishing feature of the disease in every case is that the pain is felt at the lowest part of the spine, or rather in the seat of the coccyx, and where pressure always aggravates it. Pressure and movement of the coccyx too, with the finger in various directions, produce pain, and the kind of movement which is then attended with suffering differs in different cases.

Simpson believes the pain is due to inflammation of the coccygeal joint or other morbid change, when any action of the muscles in connexion with it, by moving the joint, produces pain.

We might naturally look for the origin of the disease in some injury of the part; and in a considerable proportion of cases injury can be traced. But it is remarkable that the disease occurs in the unmarried, and where no history of injury can be made out. I, myself, have known several aggravated cases follow labour. In these I cannot doubt that the joint received injury during the passage of the child's head. In some cases we know the sacro-coccygeal joint is anchylosed, the tip of the coccyx projecting so much forwards as to form an angle with the lower part of the sacrum. The anchylosis is likely to give way during labour. And where there is no anchylosis, as the head emerges, the coccyx may be felt to be stretched very much backwards, and under the strain some of the fibres of the anterior ligaments which bind this bone to the sacrum may be torn, and in the joint thus exposed and injured inflammation is very apt to be set up. Simpson saw abscess follow.

The coccyx again is liable to fracture or dislocation from direct violence, as from a fall on the seat. Patients have complained that "a bone grows in," and so it is found. It is also liable to malformations, to deficient development, to tumours, and even double monstrosity by inclusion.

But in a certain proportion of cases no local lesion can be made out, and we are driven to conclude that the disease is a neurosis, a form of neuralgia, the expression, perhaps, of some remote morbid condition. But latterly some new light seems to be cast upon these more anomalous cases. In Virchow's Archiv, 1860 (*Die Steissdrüse des Menschen*), Luschka gives an account of a small gland situated just at the anterior end of the coccyx; it is in immediate relation with the hindermost part of the levator ani, and is connected with filaments from the ganglion impar of the sympathetic nerve, and with small branches of the middle sacral artery, between the levator ani and the posterior end of the external sphincter. The gland is rich in nerves, which form a network perforating its stroma.

This, the "glandula coccygea," Luschka says, is probably the seat of the hygroma cystica perinæalea. And when we consider its highly vascular and nervous elements, and its position, we can hardly doubt that it may in some cases be the seat of coccygodynia.

Some cases called coccygodynia I have found to be due to fissure of the anus, and to the conditions which induce the spasmodic action of the vulvar and perineal muscles, and known as "vaginismus." I have also traced it to retroflexion of the uterus.

The *diagnosis* is made out by local examination. The forefinger introduced into the rectum is applied to the inner aspect of the sacro-coccygeal joint, whilst a finger of the other hand is applied to the outer aspect. The bones and the joint thus embraced between the two fingers are completely explored, and the seat of pain and the condition of the parts are easily determined.

The *treatment*, according to Simpson, is surgical. But I have met with cases which, after long and intense suffering, got well spontaneously, or when uterine disease and general disorder were removed. At the same time, I am satisfied that surgical treatment is occasionally essential to relief. One may exhaust sedatives, neurotics, and tonics, and still the pain persists. When there is evident inflammation, leeches will be serviceable, followed by counter-irritation. Temporary ease may be obtained by the local subcutaneous injection of morphia. The surgical treatment is to completely separate from the coccyx the muscular and tendinous fibres that are in connexion with it. This is done by a tenotomy-knife passed under the skin at a short distance from the tip of the coccyx, and made to shave along the posterior aspect of the bone, and then to divide the muscular and tendinous attachments, first on one side, then and lastly all round the tip of it. It is not in every case necessary to make the division so free. In some instances the division of the fibres of the gluteus maximus of one or the other side, or detachment from the coccyx of the sphincter and levator ani may be enough. No bleeding attends the operation, which possesses also the other advantages of subcutaneous sections. Simpson admits that this operation occasionally fails, and that he consequently suggested the removal of the coccyx.

Dr. J. C. Nott prefers extirpation of the bone. Simpson's subcutaneous incision around the coccyx would divide the nervous branches which supply Luschka's gland, and in this way its success in some cases may be explained.

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Page 25, for "defecation," read "defæcation."
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